AMERICAN BEE JOURNAL

MARCH, 1918

THE MAGIC GIRL KNEE DEEP IN MUSTARD BLOOM

See "My Neighbor's Garden" in this issue

(Photograph by John R. Douglass)

AMERICAN BEE JOURNAL

VOL. LVIII—NO. 3 HAMILTON, ILL., MARCH, 1918 MONTHLY, $1.00 A YEAR

POLLEN AND POLLEN PLANTS

BY JOHN H. LOVELL

IT is seldom in the Northern States that bees run short of pollen, although this occasionally happens in early spring. Usually a supply sufficient to last until the willows and elms bloom is carried through the winter. The only locality in this country known to the writer, in which serious pollen famines occur is in the tupelo section along the Appalachicola river. Most of the pollen here in April and May is obtained from willows, maples, elms and oaks. The tupelo yields very little, and there is not much general farming. The tupelo flow, writes W. D. Achord, averages from April 20 to May 5, during which from 50 to 125 pounds of honey are stored. There is plenty of pollen up to about June 15; but after that there is little or none for from 60 to 90 days, or until September. One hundred miles northward there is an abundance of pollen throughout the season. The colonies become very weak and the queens cease laying; but neither Achord nor Marchant, two prominent beekeepers in this section, feeds substitutes.

But in Australia pollen famines are as regular as the seasons themselves. There is a "critical period" in mid--summer, when the pollen fails, the queen ceases to lay eggs and the brood dies of starvation. This shortage is attributed by Rayment to the failure of the gum-trees, or eucalypti, to produce much pollen. There are some 200 species of gum-trees in Australia, which cover great areas of arid land. So lavish is the flow of nectar that three or four nests of wild bees have been found in a single tree, and when a flowering branch is shaken the nectar falls like rain. But so small is the supply of pollen that colonies of bees working on yellow gum dwindle down to mere handfuls, although there is a fine crop of honey. Beuhne says that he has used all kinds of substitutes in large quantities, but, although the hives were well filled with brood, the bees thus raised were lacking in vitality and were short-lived. He has never been able to obtain a strong force of field bees.

Cannot, then, substitutes for pollen be used to advantage? When there is a scarcity of pollen the bees bring in bits of fresh sawdust, spores of fungi, and occasionally, in the vicinity of cheese factories, cheese mites. The beekeeper usually resorts to rye meal, cottonseed meal, wheat flour, oatmeal or pea meal, and sometimes to strange mixtures of eggs, milk and sugar. Rye meal is a favorite spring feed, and cottonseed meal has been strongly advocated. If it is desired to feed the meal inside the hive flour candy is used. This is made by mixing one part of rye meal with three parts sugar and a little water, and cooking it until it will sugar. It is then vigorously stirred and poured into greased pans. It is difficult to make, may cause brood rearing at the wrong time, and is probably of no benefit.

Fig. 1. WHITE WILLOW (*Salix alba.*) Staminate or pollen-producing catkins. A large, freely blooming tree.

The bees gather rye meal eagerly, indeed they may gather too much of it; and Root says that he has known the combs to be packed with it to the exclusion of pollen. Neither can there be any doubt that these substitutes stimulate brood rearing, for in colonies in which were healthy queens but no pollen, eggs or brood, three days after rye meal had been fed, there were a large number of eggs in the cells. The fact that brood rearing can thus be stimulated has led many beekeepers to jump to the conclusion that the use of pollen substitutes must be desirable; but Allen Latham has recently asserted that they are not only not beneficial but are positively injurious. He found that later in the season the colonies not fed were in better condition than those that were. We think these conclusions sound: Feeding meal in early spring causes the bees to waste away by flying out in cold weather when they had better remain quiet; injures their digestive powers, and the weak brood and bees thus obtained lessens rather than adds to the strength of the colony.

There are no plants more valuable for pollen in early spring than the willows, especially the pussy willow *(Salix discolor)*, the earliest of the willows to bloom. Provide an ample pollen supply by planting along the brook or in low waste land as many of the staminate bushes as you can. Do not plant the pistillate bushes, for they yield no pollen. The staminate bushes bloom regularly and produce enormous quantities of pollen. They also secrete nectar freely. They have this advantage over the elms, alders, birches, oaks and other wind-pollinated plants that none of the pollen is lost. They are insect-

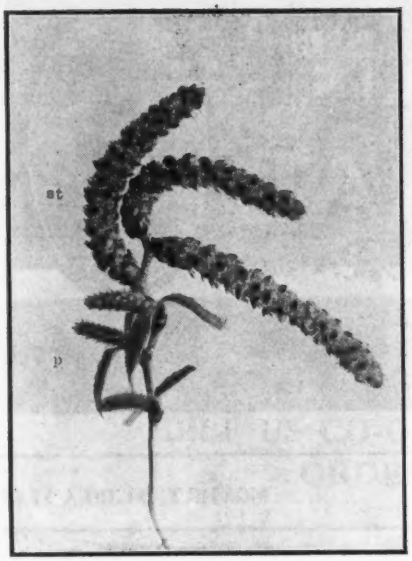

Fig. 2. YELLOW BIRCH (*Betula lutea.*) St., staminate flowers; p, pistulate flowers. A wind pollinated tree producing large quantities of pollen.

pollinated and the pollen is so adhesive that none of it is carried away by the wind. Shake an alder branch in full bloom over a sheet of white paper and it will be covered with pollen; do the same with a branch of "pussies" and only a few grains will fall. Many wild bees, ants and flies, however, visit them. A little later in the season the staminate trees of the white willow will be a great help. (Fig. 1).

Bees not infrequently gather pollen from the alders, elms and other wind-pollinated trees (Fig. 2), and if you have an avenue of elms you have little to fear from a dearth of pollen early in the season. The maples are far from being as good pollen plants as the willows. If only bees would gather pollen from the fir spruce, pine and running juniper they would, for a while, be provided with an inexhaustible store. Beat a running juniper bush with a stick and the air will be so filled with pollen that you will be glad to retreat. The clouds of pollen from the pines are easily mistaken for smoke. (Fig. 3.) The pollen seems to be too resinous to suit the taste of bees. During bloom there is, of course, no lack of pollen in the northern and western States.

Of herbaceous plants blooming in May I know of none more valuable for pollen than the dandelion. My apiary is surrounded for about two weeks with an almost unbroken sheet of yellow flowers. This result was obtained by permitting cultivated plants to produce seed. The pollen is very abundant and easily gathered, and the bees are constantly bringing it into the hives. A more pleasant, cheerful display can hardly be imagined, and many persons ask the privilege of digging "greens."

The planting of corn by the million acres renders it more important as a source of pollen than any other cultivated plant, and it blooms, moreover, at a time when pollen flowers are apt to be scarce. It is wind-pollinated and wholly devoid of nectar. Yet of the mythical honeys "corn honey" is the most famous. Only a few months ago a report of a phenomenal yield of corn honey came from Louisiana. The flow continued for more than a month; the cornfields swarmed with bees to an extent never before witnessed, and good colonies averaged 100 pounds or more from this source alone. Corn honey is described as light amber in color and pleasantly flavored; it had previously been supposed to be dark and strong flavored.

Think of it, 100 pounds of corn honey per colony. Who will now be surprised to hear of the sale of ambrosia by the bottle? At a gathering of beekeepers an apiarist still insisted, after the structure of the bloom had been described, that his bees brought in a little honey from corn. It is claimed that the nectar is secreted by the silk and in the axils of the leaves. Now the silk is com-

Fig. 3. BALSAM FIR (*Abies balsamea.*) Staminate cones producing quantities of pollen, but the bees do not gather it.

posed of the thread-like glutinous stigmas, and it would not only be useless but would be positively harmful to the welfare of the plant for them to secrete nectar, and as a matter of fact they never do. Whence come, then, the stories of corn honey? We have all seen bees gathering pollen from the spindles of corn, and Frank C. Pellett says that he has seen multitudes of them so engaged. As plant-lice are sometimes found on the foliage or stalks of corn he suggests in "Productive Beekeeping" that the gathering of honey-dew may have given rise to these reports. This seems not improbable, especially in a warm climate, and would offer an explanation of the different qualities of corn honey in different years.

In many instances, however, "corn honey" is purely a product of the imagination, like the "tule honey" of California. The tule is a wind pollinated sedge growing five to ten feet tall, and covering some 500,000 acres of wet land; in the delta region of the San Joaquin and Sacramento rivers there are estimated to be 50,000 acres of tule. As there are many beekeepers who suppose that all flowers are nectariferous, it is not surprising that they believe that this great expanse of vegetation must be the source of much honey; but Richter very properly denies the existence of "tule honey."

Since both the wild and domestic bees would speedily perish if deprived of pollen, it is astonishing to note how little attention this subject has received from the bee journals. In looking over the indices I have been surprised to find that in some years there is not a single entry under pollen, while in others there are only two or three, mostly notes relating to pollen substitutes, or the exclusion of pollen from the honey. Pollen plants certainly grow in a terra incognita of the beekeeper's world, and pollen problems are left largely to the bees. Yet they are very vital questions, and nature has spared no pains in equipping the bees with apparatus and mental qualities to deal with them. And in the end what is vital to the bee is vital to the beekeeper.

The clovers, contrary to the general impression, are not good sources of pollen. In the white clover the anthers, the organs containing the pollen, are enclosed in a keel formed by two petals and emerge only when the bee's head rests upon it; thus bees never gather pollen directly from the clover blossoms. More or less of it is deposited on the under side of the head or body by the floral piston mechanism, which the bee brushes up with its legs and deposits in the pollen baskets. I have watched bees at work on white clover day after day, but have never yet seen one attempt to obtain the pollen; and many of them had no pollen on their hind legs, and, as a rule, the masses of pollen in the baskets were small. The pollen is almost invariably described as brown or greenish brown, and on the bee's

Fig. 4. BEAN (*Vicia faba.*) The stamens are enclosed in the black-spotted keel, and consequently bees cannot gather the pollen. It belongs to the same family as the clovers, but by reason of its larger size shows more clearly why bees can bring away only the pollen the flower places on them.

legs or in the hive after it has been moistened with nectar it is brown; but in the flower it is bright yellow. Not all brown pollen in the hive comes from clover, and I have examined specimen after specimen under the microscope without finding any

Fig. 5. Wild rose (*Rosa humilis*). A pollen flower with many stamens.

clover pollen. Irregular flowers, like peas and beans, do not furnish much pollen. (Fig. 4.)

Groves of nut trees, such as the pecan, hickory and chestnut, the only nut trees which have been domesticated in this country, furnish an abundance of pollen. Rayment says that in Australia the date palm is a "splendid honey plant"; but he adds in the next sentence that large crops from it have never been reported. A part of the trees are staminate and a part pistillate and the pollen is carried by the wind, not by insects. In other words, it is not a honey plant at all, although bees very often visit the staminate trees for pollen. But wild roses are splendid pollen flowers, and the bees, both wild and domestic, visit the flowers so eagerly, as soon as they open, that the entire supply is carried off in a few hours. (Fig. 5.) The California poppy is also a good pollen flower, and in the valleys of that State covers the ground with a golden carpet much visited by bees for pollen. As for the banana, you can gather pollen by the spoonful, and bees work on it much as they do on a pile of meal. In warm regions where there are acres of this fruit there must be enough pollen to meet all requirements.

In autumn a large amount of pollen is gathered from the goldenrods and sunflowers. (Fig. 6.) They belong to the largest plant family, the compositae, which also includes the asters, Spanish needles, gum-plant, broomweed, thistles, boneset, crownbeard and marigold. In moving over the flower clusters bees controvert the familiar proverb that it is possible to do well only one thing at a time, for they suck nectar and sweep up the pollen simultaneously.

In New England large quantities of goldenrod pollen are stored away for another season. To the same family belongs that pernicious weed, the Roman wormwood, so common in worn-out fields, a wind-pollinated plant, which produces so much pollen in late fall that it is said to be one of the causes of hay fever.

We have shown that the pollen supply in a locality may be increased by planting the staminate bushes of the willows, by setting out avenue and nut trees, by seeding the land with dandelions, by raising corn, and also sunflowers, where the latter do not grow wild. The sunflower produces a great amount of pollen and yields it for a long time. In this connection it may be inquired whether there are any foreign plants the introduction of which would increase the pollen supply. One of the most promising is cape weed *(Cryptostemma calendulaceum)*, the most important pollen plant of Australia, which was introduced from South Africa in 1836 and has since spread over the entire Australian continent. Its leaves and flowers resemble those of the dandelion, and it not only yields large quantities of bright orange pollen but it is a good honey plant as well, and excellent feed for milch cows. A full description of this plant appeared in the American Bee Journal for December, 1915.

Rejecting the feeding of pollen substitutes as of no benefit, or injurious, there are only three ways in which a beekeeper can meet a pollen famine. He may increase the number of plants producing pollen in large quantities, as has just been described, or, secondly, he may move his hives to another locality temporarily; or, thirdly, he may give combs of pollen. A. B. Marchant described some time ago in Gleanings in Bee Culture how he would make use of the second method. From April to June his bees were to remain in the tupelo section, storing an ample crop of honey. After the flow was over they were to be removed to an island some 15 miles southward, where pollen was more abundant, and where they were to remain for the balance of the year.

A writer in the American Bee Journal has pointed out that it is as necessary for beekeepers to reserve surplus combs of pollen as it is combs of honey. It may in some cases be even more important, since we can feed sugar syrup, but have no substitute for pollen. It not infrequently happens, especially in localities where pollen is very abundant, that combs largely filled with pollen can be removed from a hive with apparent advantage. Bees without queens are said also to store large quantities of pollen. If put in a very dry room combs of pollen will keep for a long time, indeed, so far as I know, indefinitely, for the lycopodium powder sold by druggists is nothing more than the spores of club mosses. Why should not these combs of pollen be offered for sale like other bee supplies? The introduction of a few of them into a hive would often make a great difference in the season's results. We need to know more about the quantity of pollen a colony requires, and its relation to the economy of the bees and the gathering of the nectar.

Fig. 6. SUNFLOWER (*Helianthus annuus.*) Each morning two circles of florets bloom. so that it remains in blossom a long time. Notice the little masses of pollen on top of the flowers.

There are many problems relating to pollen and pollen plants that will well repay investigation.

Waldboro, Maine.

The Missouri Meeting.—The meeting of the Missouri Apicultural Society was held at Columbia during Farmers' Week. The weather was most unfavorable with extremely cold weather following a heavy snowfall. Trains were late, and some were annulled entirely. As a result, many were discouraged from attending. However, the program was carried out substantially as planned as most of those who could not attend sent their papers. Since a number of the men who have been most active in the affairs of the association were unable to be present, it was decided to retain the present officers until a time when they could attend. Prof. L. Haseman resigned as secretary and the place was filled by selecting Mr. A. V. Small, of St. Joseph.

Mr. E. M. Atkins, one of the men engaged in emergency work in the Bureau of Entomology, was present. He has been assigned to Missouri, Kansas, Nebraska and Iowa and will divide his time between the four States. Plans are under way for some field meetings to be held next summer. A special feature of the meeting which attracted much attention from short course visitors, was a bee demonstration in a cage by Mr. E. E. Tyler. A talk on Using Honey to Save Sugar, by Miss Louise Stanley, of the college staff, attracted a number of ladies who were in attendance on other meetings held at the college at the same time.

Mr. George O. Shinji gave an interesting account of beekeeping in Japan to an appreciative audience. Taken altogether, the meeting was well worth while, in spite of the extreme weather.

AMERICAN BEE JOURNAL

PUBLISHED MONTHLY AT
First Nat'l Bank Bldg., Hamilton, Ill.

Entered as second-class matter at the Hamilton, Illinois, Postoffice.

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THE SUBSCRIPTION PRICE of this Journal is $1.00 per year in the United States of America and Mexico; 3 years, $2.50; 5 years, $4.00; in Canada, 15c extra, and in all other countries in the Postal Union, 25 cents a year extra for postage. Sample copy free.

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THE EDITOR'S VIEWPOINT

How Old is the Smoke Method?

There is an old saying that there is nothing new under the sun, and this seems to apply particularly to bee culture. Most of us have had the experience of making some (to us) new discovery, only to learn later that somebody else had given it to the world, in some form, before we were born.

A few months ago there was much discussion of the smoke method of introducing queens and some seemed to think that it was entirely new. Henry Alley wrote in his book, "Beekeeper's Handy Book," more than thirty years ago, as follows:

"When tobacco smoke is used to introduce queens, throw some grass against the entrance to keep the smoke in and the bees from coming out. Blow in a liberal amount of smoke and then let the queen run in at the top through the hole used for the cone-feeder."

There is nothing to indicate that the plan originated with Alley. In fact, from reading the above extract one would get the idea that it was a common method of introduction at that time."

The Mason Bees

To the nature lover, no more fascinating stories have ever been written than the books by Henry Fabre, the French Naturalist. These are now being translated into English and published by Dodd Mead & Co., of New York. In the "Mason Bees" we find some very interesting accounts of experiments that throw some light on insect intelligence. All beekeepers have noted the care with which the hive-bee marks the location of her hive and the precision with which she returns to the exact spot of its location. If moved even a few feet she finds much difficulty in locating it again. The Mason bee was unable to find her nest when moved but two or three feet distant. Even if she found it she was unable to recognize it as her own in its new position and started a new nest rather than accept the old one in a new place. On the other hand, when the nest of another bee was placed in the exact place where her own had been it was accepted without question, even though it did not resemble her own.

Mature bees carried to a distance of two miles from their nests returned directly, usually stopping to gather a load of honey or pollen on the way. Experiments indicated a strong homing instinct in these wild bees. This is the same instinct that guides the carrier pigeon to its home, even though it is carried in a dark basket many miles from any place it ever knew.

In marked contrast, he found the Amazon ant unable to find its way home from any distance except by the exact route it had followed on the going trip. If placed even two or three feet aside from its path it was unable to find its way back again, and wandered around in hopeless confusion. The book is well worthy of a place in every nature lover's library.

California Beekeepers

The California Beekeepers' Association seems likely to organize itself into a Co-operative Association and the Western Honey Bee is doing all it can to promote this. It would be a step in the right direction. The time is coming when such organizations will be found everywhere, we believe.

Are the Cells of the Bees Hexagons?

Mr. E. F. Bigelow, editor of the "Guide to Nature," in an article published in his February number and illustrated with numerous beautiful studies, criticises the making of comb foundation in hexagon cells, because he holds that the bee does not build hexagons He brings, in proof of this, cuts of foundation partly finished by the bees in which the tops of the cells are round. He also mentions the fact that queen-cells are always round.

The bees build their cells with the least expenditure of costly material, beeswax. Economy requires that the cells be built so as to fit closely to each other and the six-sided shape is the most economical. On the other hand, the surface of the cells must be strong enough to carry the bees in their travels, so the bees make a heavier rim at the surface. When we uncap the sealed honeycombs we destroy the strength of the upper edge and uncover the hexagonal shape. But the bees, as soon as the comb is returned to them, hasten to give it the stronger surface, by rounding the tops of the cells.

Foundation mills used to be manufactured with a rounded cell. The Dunham mill, which was so popular 35 years ago, made foundation with round cells. But the bees always excavated the surplus wax from the three-corned angles and used it in other parts of the comb. So, after all, comb foundation with hexagonal cell walls is **not** an error.

But that the hexagons of the cells are not always perfect does not admit of a doubt. Neither need we doubt that, if the bees had plenty of material, they would probably build all their cells round, for their bodies are round.

The Mating of Queens

"A study of the factors which govern mating in the honeybee," Bulletin No. 34, of the Michigan Agricultural College Experiment Station, by Dr. George D. Shafer, is before us.

This is a scientific description of

the mating organs of both the queen and the drone, and a study of the position assumed by the insects in the act of copulation. It should be of interest to all scientific students of bee anatomy, though containing too many scientific terms to be read with profit by the average scholar.

The text is accompanied by two plates of drawings and photographs. Mr. Shafer shows that he has carefully studied his subject.

Slowly but steadily these cloudy questions are getting more distinctly understood. The amount of research which has been expended, for so little positive knowledge, shows how much remains to be done. Praise is due to the men who spend years of their life in these arduous studies.

American Honey in Italy

According to L'Apicoltore, of December, 1917, they have received in Genoa about 11,000 quintals of American honey, which was selling at 500 lire per quintal. We first figured this at the regular exchange price of lire for dollars. But the Italian lire is now very much depreciated in its exchange for our money. The usual exchange value is 5.20 per dollar; the present is (January 22), 8.40 per dollar. The quintal is 220 pounds. The honey was, therefore, selling at Genoa at 27 cents per pound. Whether this honey was from North America, the West Indies, or the Spanish-American republics is not mentioned.

When we realize that transatlantic rates are soaring beyond all reason and that the risks of transportation make marine insurance very high, perhaps this price of honey is not more than would necessarily be expected.

Beekeepers' Conventions

Formerly it was the custom of the bee journals to give extended accounts of the various meetings of beekeepers. This is no longer possible, because the number of conventions has increased to the point where to do so would occupy all the available space in the Journal. Where there were formerly but a dozen or two conventions of importance in the entire country, now more than that number are held within the limits of a single State. We are always glad to receive notes concerning the various meetings, but would call the attention of the correspondents to the necessity of making the accounts as brief as possible.

Securing Sugar For Feeding Bees

From early reports coming in where bees have had a good flight and it has been warm enough to make a superficial investigation, it appears that bees have consumed a large proportion of their winter stores already and that feeding will have to be done early and in quantity.

The shortage of sugar is acute, but we believe that beekeepers will have no trouble in getting such sugar as they will need if they take the matter up with their grocer or with their nearest wholesale house, executing affidavit as below and explaining the matter thoroughly. The Food Administration has expressed its desire to see that all beekeepers are supplied with sufficient sugar.

If you are unable to get sugar locally, execute affidavit as below and send it at once to your State Bee Inspector so that he may take the matter up at once and do what he can to get the sugar.

If desired, he will furnish copies of this affidavit free. However, we urge every beekeeper not to wait, but to make proper affidavit and take the matter up at once. A week or two may make it too late.

Following is copy of affidavit:

STATE OF _____
ss.
County of _____

I, _____, being duly sworn, state upon oath (or affirm) that the following statements are true:

I am the owner or have in my possession _____ colonies of bees. The bees above mentioned will need sugar for food in order to live or be in suitable condition for gathering surplus honey during the season of 1918. I estimate that I will need _____ pounds of granulated sugar for the purpose of feeding. If I am permitted to secure this sugar or any part of it, I will use it for food for the bees and for no other purpose and if any remains unused at the beginning of the surplus honey flow, I will return it to the dealer from whom I purchased it or to whomever the Federal Food Administrator shall direct.

My postoffice address is _____

My nearest shipping point is _____

_____(Seal)

Subscribed and sworn to before me this ____ day of _____ 191__

_____
Notary Public

My commission expires _____

The above affidavit must be executed before a Notary Public or other officer qualified to administer oaths.

Food and the War

The need of saving food is imperative if America is to win in the world war. Pork, wheat and sugar are the most available food for transport to feed the armies, because they are readily preserved and easily carried. We can live without discomfort on such products as cannot be sent abroad. To make the most of what we have will require readjustment of the food habits of the average American family, but there will be no complaint on the part of the loyal citizen intent on making any necessary sacrifice in order to support our soldiers in the field.

To give the housewife the best available information concerning the work of the food administration and suggestions providing the best possible food for her family, while at the same time saving the foods designated, we have arranged for a series of articles on "Food and the War," by Mrs. Mary G. Phillips. Living in Washington, Mrs. Phillips has an excellent opportunity to keep in touch with the work of the government. We commend these articles to the attention of the ladies.

Honey Production in British Columbia

The Bulletin on honey production in British Columbia shows reports of 382 beekeepers owning 1,685 colonies with a crop per colony of 51 pounds.

The harvesting of honey-dew by their bees in 1916 resulted in a winter loss of about 40 per cent.

GROWING SWEET CLOVER

Cultural Requirements of the Plant Under Field Crop Conditions

IT frequently happens that, having seen sweet clover growing along roadsides, on gravelly banks and other unpromising situations, we are surprised to fail in getting a stand in a well prepared field. Sweet clover requires a firm seed bed, and will not succeed on land where the soil has been deeply stirred and left in a loose condition. It is well to scratch the surface with a tool that does not penetrate deeply, leaving the surface loose for an inch or so, and compact below. While it will succeed on a great variety of soils, it requires that they be in well settled condition and not freshly plowed to a depth of several inches, such as best suits many forage plants. This condition probably accounts for more failures in getting a stand of sweet clover than any other cause.

Sowing the seed on top of the ground or on the snow in winter, will often secure a good stand with no cultivation at all. Good results often come from sowing it with small grain in spring, on land that has been cultivated the previous season. Some succeed by sowing after the last cultivation of corn, the seed germinating to some extent the same season, while some does not sprout until the following spring. The ideal condition is to cover the seed from half an inch to an inch with finely pulverized soil, with a firm soil underneath.

Time of Sowing

Sweet clover may be sowed in winter or early spring, as above stated, or at any time from March until August. It should not be seeded when it is likely to start so late that it will not have time to establish itself firmly before winter. Under the different conditions of soil and climate of this great country, it is difficult to give general directions that will apply everywhere.

The time of sowing will depend much upon the manner in which the crop is to be handled. Where it is desired to sow the seed on old meadows or pastures without plowing, it will probably be best to scatter it in winter or early spring. The freezing and thawing have a tendency to soften the hard coat of the seed, as well as to cover it with earth. As a field crop, the writer's limited experience would indicate that spring sowing, with a nurse crop that can be cut early, will be best.

There is a great diversity of opinion as to the proper amount of seed to sow. Where it is used to thicken up meadows or pastures a smaller amount is needed than where sown as a field crop on newly prepared land. Some growers say that 4 pounds of good unhulled seed per acre is sufficient to sow on grass lands. As high as twenty pounds of hulled seed per acre is advocated by some for a field crop. The seed covering is very hard, and, unless treated, only about half of it will grow the first year. If the seed is scarified the hard coat is scratched until it germinates readily, and much less seed is necessary to secure a stand than otherwise. Ten pounds of hulled and scarified seed per acre should be sufficient on good land.

It is often difficult to get a stand on old land which is deficient in lime, for lack of the nitrogen-gathering bacteria that thrive on the roots of the clovers. It is sometimes necessary to treat a small area with a good coat of manure, and sometimes with crushed lime. After the sweet clover is growing well on this land the area can be gradually extended.

Utilizing the Crop

Probably there is no forage crop which will furnish as much pasture per acre as will sweet clover in its second year of growth. It should be allowed to get a good start in spring before stock is turned in, and the area should be sufficiently large for the animals thus kept. Cattle, hogs and horses all eat it with relish after they become familiar with it, and thrive equally on it. It is a common practice to pasture the crop during the first part of the second season and then to turn the stock off and harvest a seed crop. The writer has harvested a very good crop of seed from a limited area, which was pastured lightly through the entire summer until the crop was cut. Of course, it is not possible to pasture heavily after midsummer, and still secure a good crop of seed.

Sweet clover makes a good quality of hay if cut at the proper time and well cured. If a seed crop is to be cut, the first crop of the second season may be cured for hay by cutting high enough to leave some of the small branches on the lower part of the stem. If cut too low at this time the plants will die. Sweet clover hay requires more time to cure properly

TAKING SOIL FOR INOCULATION FROM A SWEET CLOVER PATCH

CUTTING WHITE SWEET CLOVER

than the clovers with smaller stems, but if piled in small cocks it is little damaged, even though some rain falls on it. If properly cured, it makes a very good winter feed. When cut for hay it should be mown before it begins to bloom to any extent. When it is about two feet high is the right time. The first year it may be cut at almost any time the grower finds it convenient.

Some practice sowing sweet clover with early oats, cutting the oats with a high stubble, and, later, getting a crop of hay.

Saving the Seed

The seed crop sometimes fails because the plants are too thick on the ground. They spread or branch widely as they grow, and where they are too thick the blossoms may drop off without setting a full crop of seed. Usually best results are obtained where a first crop is cut for hay or is pastured until midsummer. The second crop does not grow as high as the first would do if permitted to seed, thus making it easier to handle. Seed is obtained only the second year, and if the first growth of that year is permitted to seed, the plants will die when cut, so that only the one crop can be obtained.

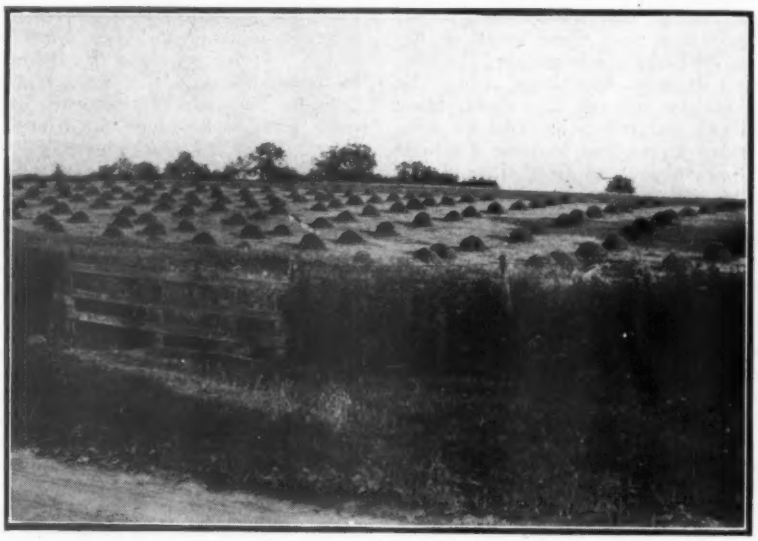
The seed ripens so irregularly that it is not always easy to tell just when it should be cut in order to save the largest amount of seed. At best much of it will shatter off and be lost, since the first to ripen will be ready while there is still a large amount of bloom. The most seed will be secured by cutting when about three-fourths of the seed pods have turned brown. If cut sooner there will be too many blossoms and immature seeds; if cut later too much of the ripe seed will shatter in the harvesting. Usually enough seed shatters off to reseed the land. Some growers have been able to continue the same land in sweet clover for fifteen or twenty years by sowing two years in succession to begin with. After the first year, a crop of seed will ripen every year.

It is something of a problem to harvest the seed without losing a large portion of it. The writer has cut a small field with an ordinary mower when the plants were wet with dew, and immediately raked it into windrows. This method is hardly to be advised where the seed is to be hauled to a threshing machine, since more of the seed will be wasted than where it is bound into bundles. This small field was threshed by hand with forks. A large sheet of canvas was laid on the ground, and the sweet clover carefully lifted on it, after it was fully dry. By beating with the forks the seed was readily separated from the stalks.

The ordinary grain binder is generally used for this purpose. Where much seed is to be harvested, it is necessary to provide some special pans to catch the seed that shatters off. Corn binders have been used in some cases.

When threshed with a grain separator, the straw is broken up so much that it makes a fair forage for wintering cattle or horses. They will not eat it readily where threshed by hand, since the straw is not broken up to any extent and the dry stalks are too coarse otherwise.

Those interested in this subject will do well to write to the U. S. Department of Agriculture for Farmer's Bulletins 797, 820 and 836, all of which deal with different phases of the culture of sweet clover. They give in much greater detail information that space will not permit here.



A FIELD OF SWEET CLOVER AT HARVEST TIME.

SWEET CLOVER ON THE LEFT, GRIM ALFALFA ON THE RIGHT

Quadruple Vs. Single Row Winter Cases

By G. C. Greiner.

THE old adage, "Convince a man against his will, he is of the same opinion still," contains more truth than poetry. And this is not strange. After we have spent almost a lifetime using certain appliances and tools it becomes, as it is termed, second nature to us, and with normal, natural abilities we become experts in their application. To make a break in our accustomed habits and adapt ourselves to new methods would not only be up-hill business, but in many instances would cause heavy expenses and extra labor. The beaten path, crooked as it may be, is always easier traveled than deep snow on a straight line, even if we could save one-half of the distance. In fact, if we should undertake to make a short-cut of this kind, the average people would call us "cranky," no matter how much they would be benefited by our effort in the end.

These conditions we meet in almost all walks of life. It is not only the beekeeper of many years' experience, who thinks his beaten path is the straightest, but all other occupations are laboring under the same deception.

It is not my object to open up any controversy with either the quadruple, the straight row or the single colony advocates. Each one of these three methods has its advantages. This cannot be denied, and it would hardly be advisable for anyone who

is accustomed to his particular kind and has stocked up with an extensive outfit in that line, to make a change. Besides the dollar and cent point of our occupation, contentment of mind is worth a great deal. If we can perform our daily tasks to our own comfort and satisfaction, life becomes a pleasure and is worth the living.

For the benefit of our younger brother beekeepers who have not yet decided which kind of winter case to adopt and are contemplating making a supply during winter for future use, I will enumerate a few pros and cons of the quadruple and straight row case, as I have gathered them up during my many years of experience and observation.

The single one-colony case used by many experienced beekeepers with good satisfaction, we will leave out of consideration, as the preference of the majority of beekeepers seems to be one or the other of the two larger kinds.

When I left my bee-cellar dug into a gentle slope of one of Naples' sidehills nearly twenty years ago and moved to my present location, which is situated on the level plains of Niagara County, the wintering protection problem was uppermost in my mind. Although surrounded by orchards, groves, buildings, etc., the new locality offered no dependable windbreak for my bees, and as wintering out doors had become a much-talked-of subject at that time, I decided to add winter cases to my beekeeping outfit.

From my earliest beekeeping days I could see almost numberless advantages in keeping bees in straight rows, all facing one way (east or south), and as a natural consequence my choice was the single one-row winter case. Being always cautious when launching out onto new schemes of this sort, wishing to make sure of their practical use, I made only two or three as a trial the first season. In planning my work I made the great mistake of considering the economical side of labor and lumber only, leaving all other, much more important features in the background. I was shortsighted enough to build my cases, or sheds, as I generally call them, for nine colonies, making them as long as 14-foot lumber would allow without waste.

When I moved my sheds to the yard (in sections, of course, for I could not handle them all put together) it dawned upon me at once that I had made a great blunder. Where should I get the bees to fill them? It would take the bees from half way across the yard to do it, and to spread them out again in the spring would be a long, disagreeable task. I did not use the unwieldy things a second time, but before another packing for winter came around I had them cut into two parts, making a five and three-colony case of each one of them. That relieved me in a measure of shifting my bees first towards the large sheds and then back again to their summer stands in the spring.

Since then I have had the five and three colony sheds as a mixed lot in my yard and find that the smaller ones are by far the most practical and convenient to use, so much so that I have begun to cut down the larger ones to the smaller size, making one-colony cases of the cut-off pieces.

In speaking of the quadruple cases I do not intend to belittle anybody's work or theory. On the contrary, if properly made and rightly managed they give good satisfaction. Some of our best beekeepers use and recommend them, and they know whereof they speak. Economizing heat by way of the enclosed colonies standing side to side and back to back is one of their most important features. In proportion to their cubical capacity they are most economical in regard to the lumber used in their construction, and we all know that it requires less roofing to cover a square than an oblong.

But it is also an undeniable fact that they have some undesirable features. For instance, one-half of their inmates have to face the opposite direction from the others, always exposing one side or the other to the severity of prevailing storms. Another objection is their clustered position. To have access to all four, the operator is obliged to walk constantly from one side to the other and always pass in front of the hives. Besides miles of unnecessary travel during the season it has a tendency to irritate the bees; many attacks may be the direct result of this oversight.

It is very different with the straight row system, if the apiary is ideally laid out. Rows should be at least ten feet apart and hives should have about two feet between in the rows. When doing any beework during the season it is always one step from hive to hive; the operator is always on the same side (the right side of the hive), which makes all manipulations much more convenient; every hive is a seat for the next one and forms a shelf for his tools and at no time is it necessary to come anywhere near hive-entrances.

Our first lessons in geometry taught us that a straight line is the shortest distance between two points. Small and unimportant as this straight line business seems to be, it saves the beekeeper many unnecessary steps during the season. I apply this principle systematically to all my beework, and when extracting time comes around I reap special benefit from its application. In a straight line I take my wheelbarrow with comb baskets to the end of the row, and turning around I have again a straight line back to the honey-house, gathering up combs for the extractor from hive to hive.

When I stand in front of my three-hive winter case and compare the relative positions of the entrance of the three colonies when on their summer stands and in the winter cases, the bee-passages before and after packing are either in the same place or so nearly so, all being on the same level and in the same plane, that no drifting or confusion will occur when the change is made. Thus the three-colony single-row shed eliminates all necessity of shifting bees in the fall, as well as in the spring, which, to my mind, is an essential feature.

I do not use my hive-stands for the sheds, but they are stacked up and set on little blocks; they will last a life-time if lifted out of the ground in the fall and given a chance to dry during winter. A little repair where needed, a nail here and there, will greatly prolong their service. Some of my stands have been in use over thirty years and are yet in fairly good state of preservation.

La Salle, N. Y.

The word "drifting," used by Friend Greiner in the latter part of the foregoing article, indicates one of the greatest objections (for us) to the use of the quadruple case, or in fact to any case which requires the moving of the colonies together for packing, and we believe that this is one of the strong points in his method.

When colonies are moved together for winter and there is occasion for any of their bees to take flight, there is more or less confusion among them in recognizing the new locations. The result often is that the strong colonies, making more noise, attract the bees of the weaker ones who "drift" to the appeal. We have noticed this, years ago, and that is what dissuaded us from moving the hives at all. But we are inclined to think that perhaps our experience was exceptional. However, lately we have heard so much of colonies "drifting" and the weak ones losing bees to the profit of the powerful ones that we are strengthened in our dislike of moving colonies at all on their stands for winter. Friend Greiner's method avoids the moving, and drifting is not to be feared.—Editor.

Beekeeping in Santo Domingo

By H. Brenner

NEARLY three months in Santo Domingo, I think I can give pretty accurate information about beekeeping conditions here and about land and people. A lady beekeeper in Sanchez made this season from 60 colonies 30 barrels (50 gallons each) of honey. Even now enough nectar is coming in that I could make strong colonies fill a super with honey. My work at present is queen rearing, getting the queens in the supers mated and starting new apiaries with the nuclei.

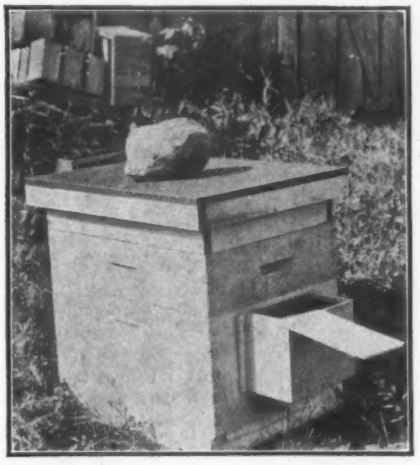
Sanchez is situated at the north end of a bay 30 miles long and 12 miles wide, northeast of the island. The bay is really the continuation of the river. On the south side of the

bay we located and stocked already with nuclei four new apiaries on land owned by Dr. Maldonado. At the north side of the bay we bought four small pieces of land from five to ten acres each, to which I am bringing nuclei as soon as I have them ready. We also located places on the river as far as we can go up in a motor-boat. A railroad runs 31 miles from Sanchez to the interior, and the doctor secured places on it also for apiaries. This is about all in the vicinity of Sanchez. On the north coast the doctor owns considerable land. I went there once over the mountains and came through the towns or villages of Matanzas and Cubreras. On the way we crossed three good-sized rivers (one over a hundred yards wide) in log canoes, the animals swimming behind. In this locality we have 30 colonies in logs and have the hands instructed to buy as many more as they can get hold of. As soon as I have time I will go there, take two breeding queens along in two-frame nuclei, transfer these bees, brood and good comb, to 10-frame supers and start apiaries there as I am doing here now. The native bees are the worst to handle I have ever met with, but very fine cell builders. Five days ago I received from a friend in Porto Rico 13 queens of my stock in two-frame nuclei. The honey here, which I have examined, is lighter in color than the Porto Rican honey and of very good flavor. The country I have seen is thickly wooded or virgin forest and only here and there small patches in fruit and cacao, and very thickly populated. The people are good-natured and peaceful, but do not like to work, and this is one of my main difficulties. Nature produces most anything they need, so it is necessary to pet and coax them, if you want any help. With the rich and cheap land the island has, it is my opinion that as soon as settled times return the small 5 to 10-acre farmer will invade this island from the north, start farming with poultry, bees, dairy, etc., and gain prosperity in no time. If he knows something about mechanics and carpenter work, as we Texas farmers do, he will be almost independent and his independence secured. It is certainly amazing when I relate to my friends here the stories circulating in the States and even in Porto Rico about the unsafety of Santo Domingo and the wild and uncivilized population. On my trip to the north coast, which lasted 13 hours, the few people we met always saluted first and gave very polite information. In the few huts we saw and entered we had to rest and accept coffee and fruit. My friends told me that even in the revolutionary times they only cut each other's throats and did not harm the stranger who kept out of politics. We have direct mail and passenger service from New York to Sanchez twice or three times each month. To visit in the future the apiaries situated near the water we are going to use a small motor-moat, which the doctor has already ordered. I could narrate some very interesting incidents, which I had on my trip over the mountains and in crossing the flooded rivers and the trouble we had with the animals, especially the pack mules. On the water we once had a rough sea and had to return, bees and all, as the motor was flooded and did not work. For the next load I took a sailing boat and had better luck.

Sanchez, Santo Domingo.

The Hubbard Feeder

HUBBARD Brothers, of Boyne Falls, Mich., seldom resort to feeding, since the shallow combs which they use over their comb-honey supers furnish a reserve supply of stores for every colony. However, in the best regulated apiary there will occasionally be a colony which for one reason or another must be fed. For this purpose they have devised a feeder which is attached to the back of the hive, as shown in the picture. An inch auger hole in the hive-body, which is opposite a similar hole in the feeder, gives the bees access to the syrup. The feeder has a metal cover which fits very tight and thus prevents rainwater from dripping in, or robbers from getting a taste. A piece of wire cloth, which slants across the feeder from top to bottom, enables the bees to get the last drop without danger of drowning.



THE HUBBARD FEEDER IS SAFE FROM ROBERS.

This feeder can be filled at any time without disturbing the bees, as it is not necessary to open the hive or interfere with the normal flight of the bees at the entrance.

Strained Honey

By J. E. Crane

STRAINED honey! What memories cluster about these words! Again I see the old one-story wood-colored house, with its huge chimney and fireplace, where I was born and lived my childhood life. with father and mother, brothers and sisters. And back of the house the orchard, and the well, with its old-fashioned sweep for lifting the buckets of water from between the walls of stone. Near by was the bee-house, for no one thought of keeping bees, in those days, without a bee-house. This house was really a shed with one roof sloping to the north, and boarded up on the north side and open on the south side, so the sun warmed the bees in winter, causing many to fly out in cold weather and get lost, or making it so hot in summer as sometimes to melt down the combs. And then there were the long, golden autumn days and frosty nights. Then father would say it was time to "take up" the bees, for "the brood was all out of the combs." Mother and brothers and sisters were all interested as father melted some sulphur on a shovel by the kitchen fire and prepared some great "matches," as he called them. Then we went to the yard in front of the bee-house and with a spade cut out a hole in the ground ten or twelve inches square and ten inches deep, sticking three or four "matches" in the bottom. After much knocking or thumping on the hives to discover which were lightest and not likely to winter, the matches were lighted and the hives set over the burning sulphur one after another. How sorry I felt for the poor bees to be smothered in this way when they had done nothing to merit such a fate. Soon the hives father had decided to "take up" were all silent and taken to the large kitchen and the combs cut out; some of the whitest were saved for company and the rest piled into great wooden bowls for "strained honey." Later, when the little mother had time, a milk pan holding six or eight quarts was taken, two sticks laid across the top and another pan punched full of holes laid on the sticks, into which the combs of honey were placed after cutting them crosswise and lengthwise and every way, to drain for "strained honey." I can almost hear that honey today as it dripped into the empty pan. How good it looked as the lower pan slowly filled with the pure honey free from the dark comb. And once, I remember, when the little mother was out of the room, and I thought no one would see me, I helped myself. Surely "stolen waters are sweet and bread eaten in secret is pleasant," but did ever a morsel pass juvenile lips and taste more delicious than the scrap of wax besmeared and dripping with amber honey? As the honey ceased to drain the old combs were stirred and placed in the oven warm enough to melt the combs, and the golden wax ran over the honey. How wonderful it seemed in those far-away days! Yet how slow the process; but in those days we cut our grass with a scythe and our wheat with a sickle and threshed it with a flail. Today we have our mowers and reapers, our threshers and seeders, our autos and even our flying machines. But how about strained honey? We do not need to strain honey these days, someone will say, for we have the

"extractor," a wonderful invention that has revolutionized beekeeping. Yes, we have the extractor, but there is yet much honey to strain or separate from the wax. There are the cappings, removed to make the combs ready for the extractor. Then we have more or less sections that get broken in handling or injured so as to be unfit to market, for accidents will happen in the best of families, as well as with beekeepers who have to depend on inexperienced help. And then there are more or less combs that are ill-shaped, or where the starters have fallen down. More or less may granulate before it is shipped to a distant market, or gets broken in transit. We recently had nearly a hundred cases sent us from the city that had been shipped in by different beekeepers; the most of it had to be strained, or the wax separated from the honey and got into shape to market. When we think of the large amount of cappings that will accumulate where the honey is extracted from several hundred hives, or even one hundred, the old way seems quite too slow, and we may find it to our advantage to have a box or a number of boxes three or four feet long by eighteen inches wide and ten or twelve inches deep with a galvanized wire cloth screen with one-fourth inch mesh nailed to the bottom, beneath which a metal bottom will conduct the dripping into a vessel below. Into such a box the cappings and broken or injured combs may be thrown, and, if it sets in a warm room and is stirred a few times, most of the honey will drain out and be in no way inferior to that which comes direct from the extractor. After a few days it will cease dripping, or nearly so; then they may be thrown into a barrel and the box again filled with cappings to drain, or they may be treated at once with a melter. As the little mother long ago treated the combs to a strong heat, strong enough to melt the wax, to get all the honey, so we must now treat the cappings and combs to heat sufficient to melt the wax if we would get it all. It is rather surprising how much honey remains in the cappings after the honey has ceased to drain out, probably twice the weight of the cappings. There are various ways of separating the last of the honey from the cappings, but I believe none so good as a melter designed especially for this purpose. I have recently had one made for my own use that suits me well. A pan of galvanized iron three feet long by eighteen inches wide and four inches deep is made. Into this an extra bottom is soldered, extending from one end to within four inches of the other end, where it turns up as high as the edges of the pan. This makes a water jacket one inch deep over the bottom of our pan with opening at one end for filling with water and escape of steam. Small holes are drilled through the end opposite the opening for the escape of the melted wax and honey. The pan is set in a wooden frame so the ends may be raised or lowered to suit our convenience. A small oil stove underneath gives necessary heat.

Middlebury, Vt.

My Experience With Bees Shipped in Combless Packages

By John Kneser

Read at Wisconsin State Convention, December, 1917.

BRIEFLY I wish to give my experience in purchasing bees in combless packages.

When bees are purchased in this manner the orders should, of course, be placed early in the season, and in packages no smaller than at least two pounds; and it is further essential that they be received before fruit bloom. The purchasing of bees in combless packages, while not so advisable where purchasers have not hives and drawn combs, is recommended as being highly desirable and profitable, especially so in view of the present price of honey. In the event that purchasers have no hives or empty combs, it is advisable to buy the colonies outright.

When following the above suggestions, purchasers should secure bees from the South during the months of April and May, and under ordinary favorable conditions they can build up strong colonies, for the June and July flow.

There may be a prevailing opinion among some beekeepers that when purchasing bees from the South in combless packages there is a likelihood of their having foulbrood, and possibly, therefore, transmitting the disease to healthy bees. The opinions of overwhelming authorities are to the contrary; that foulbrood is not usually transmitted by purchasing bees as outlined.

About five or six years ago I tried the experiment by sending for different sizes of combless packages of bees with queens. I was well pleased with the results. Further, during the month of May, 1916, I received twelve two-pound packages with an untested queen in each package. These packages arrived in good condition and just in time for the clover flow, which commenced late in June. These bees produced more honey than the average of my other colonies. During the spring of 1917, because of conditions wholly beyond my control, the purchasing of combless bees was not very satisfactory, for the reason, first of all, that the bees arrived in poor condition, the loss being about 60 per cent. In addition to that several other factors entered into this unsuccessful venture: The congested condition under which they were expressed; exceedingly hot weather during shipment and during preparation for shipment; too great a proportion of old bees and inferior queens and virgins sent.

Although I had losses, nevertheless, taking the mean between the two, the profits realized are far more satisfactory than by any other method known to me.

Milwaukee, Wisconsin.

Early Spring Suggestions

By Frank F. France.

MR. BEEKEEPER, what plans are you making for the coming season? It is now time to think over every detail necessary for the work of 1918. If you have a business system, your work will be a pleasure. It is a very good plan to take an inventory of everything, the number of colonies, the number of supers of good worker comb, extracting combs, extra frames with foundation, worker combs full of honey for spring feeding, number of extra bottoms and covers, and storage cans. How is the condition of your auto or truck? Does it need repairs or overhauling? If so, now is the time to have it done by your service station. It can be done cheaper and better at this time of the year than when the rush of the season is at hand.

Time is the most important factor today. Let every minute of your time count, just as every factor counts in this great war. Your new supplies should be all ready for the coming season. Clean up all surplus combs of excess wax and have them graded as to kind and quality, namely, drone and worker comb. The importance of extra combs in the spring, summer and fall means the same as money on interest and when filled with brood or honey they are forms of security bonds in readiness for your crop. All old, broken comb, cappings and scrapings send to the wax-rendering specialist. It will save you time, fuel and money.

What about your equipment; is it standard? Do you know that this war's greatest lesson is standardization? Not only does it apply to war supplies but to everything else. If you have all kinds of hives and frames of different sizes, you spend half the time fitting parts together. This is lack of standardization. Keep all parts of one size and make, so they be interchangeable. Make standardization one of your policies and you will be insured a good return for your investment. Standardization is also economy. It is simple, it is reliable, it is free of complications. If you have good standard hives of the same size and make it is also easier to control disease.

What will become of the business of the young beekeepers who are in the war or may go to it? Many have gone to the training camps, some to Europe and a great many more are on the draft list, not knowing whether they will or will not be exempted. The United States is going, sooner or later, to adopt a universal military training system whereby all young men physically able will be trained. If we beekeepers were a unit to help one another, it would be easy to find someone to care for

the bees of the soldier boy, but now, if he cannot find a person, his business will be a total ruin. I may be one of the many thousands to join the colors, if not exempted, but I am, with the rest of the boys, ready to go at any time to help press out German militarism. The wartime appeal is to help Uncle Sam first and ourselves last.

I do not think many beekeepers understand the tin can situation. The price of cans will probably not be any greater than last fall, as the government, I am informed, has tin prices under control. It is the supply of cans that is limited, and whether we can get them at all will be the question. Also how long after we order them will the shipment arrive, since war freight is to have the right of way, so that all other freight not perishable will move slowly? Of course the transportation system depends largely on what will happen to the Kaiser this spring and summer. Our transportation system and our home power plants will largely need the motor truck, which may be the future means of carriage.

Platteville, Wis.

Suggested New Antiseptic Treament for Bee Diseases

By W. J. Sheppard.

A NEW antiseptic known as "flavine" that has been found highly sucessful in the treatment of wounds and disease on the battlefields of Europe seems likely to be of benefit to beekeepers as a remedy for bee diseases. It is reported that experiments have been made with it in England during the past season in the case of a few colonies having Isle of Wight disease, and that it has effected a cure. If that is so there would appear to be no reason why it should not be equally efficacious in the treatment of other bacterial diseases of bees, American foulbrood, European foulbrood and sacbrood. From enquiries made by the writer as to whether it had been actually tried as a remedy for foulbrood as well, he was informed that up to the present it had only been experimented with in one instance and that the result was satisfactory.

The difficulty hitherto experienced in treating bee diseases antiseptically has been that antiseptics powerful enough to destroy disease germs have, as a rule, been harmful to the bees, and generally highly injurious, or fatal, to the unsealed brood.

It is stated that the essential qualifications for an ideal antiseptic are that "it should be non-poisonous and non-irritant to any tissue of the body, harmless to the phagocytes (the white warrior cells of the blood), potent to kill disease germs in the presence of blood serum, and stimulating to repairing tissue." It is claimed that "flavine" comes nearer to this standard than any other antiseptic at present known.

For the treatment of bee diseases, if further tests prove its efficacy, it possesses several advantages that are obvious. It is inexpensive and easy of application. Five grammes, equaling 77 grains, costs only 32 cents. For the treatment of Isle of Wight disease in spring and summer one grain is dissolved in one quart of warm water and sprayed into the hive with an atomizer, so that the eggs, larvae, bees, combs, floor-board, etc., are thoroughly dampened. A second application is given after five days. If the weather prevents the opening of the hive, one pound of honey, or sugar, is dissolved in one pint of the fluid and fed rapidly, and followed by spraying when weather permits. For autumn treatment a stronger spray is recommended, consisting of one grain of flavine to 16 ounces of warm water to commence with. Also soft candy medicated with one grain of flavine to the pound. Probably similar treatment would be suitable for foulbrood and sacbrood.

It is said that it is safe to use combs over again that have been in contact with diseased colonies if they are sprayed with the fluid of the first mentioned strength by means of a mist sprayer of sufficient power so that it penetrates to the bottoms of the cells. The fluid has a greenish fluorescent tinge so that its penetration is easily perceptible. There are two preparations of "flavine," called acriflavine and proflavine, the former being slightly more expensive than the latter. Possibly this treatment will be given a trial next season at some of the experiment stations on this side of the water, as it seems to give great promise of good results.

Nelson, B. C.

Advertising Honey

By Jay Smith.

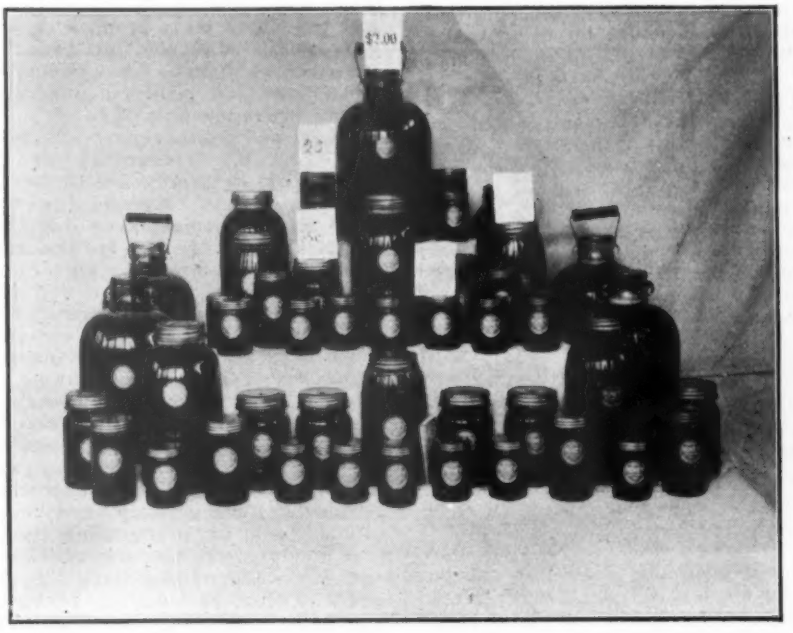
AT the present time, honey is almost selling itself, but the time will come again when it will be necessary for the beekeeper to do some hustling if he expects to get rid of his honey at remunerative prices.

"It pays to advertise." Every one will tell you so, and it does, but it must be of the right sort. If a person is not careful in advertising he will find it an easy matter to lose money thereby.

One should sell his honey locally if possible, for not only can he get a better price but he will save the middleman's profit, freight charges, etc.

For a number of years I have bottled honey and sold it to the grocers. The average grocer will take a few bottles out of the case and set them on the shelf, but no one will know what it is. It may be jelly, apple butter or most anything as far as the purchaser can tell. Then many storekeepers are not salesmen and many of them employ cheap clerks, who are not salesmen. A customer comes into the store and the clerk says, "What will you have?" The customer tells him, buys it and goes out. The customer did not say, "I will have some honey, please," because he did not know that the storekeeper had honey for sale. In making my rounds to sell honey, a grocer frequently has said, "I have still on hand some that you sold me a year ago." He only bought one case the year before, and sold part of it when someone called for it, when the baby had the "croup."

I tried to get grocers to mention that they have honey, and when a customer comes in, ask if he wants some fine honey, but grocers have



HONEY MUST BE ATTRACTIVELY PACKED TO BOOST SALES.

hundreds of things to sell, and of course cannot go over the entire list.

I tried advertising in the daily papers, but found I could sink a lot of money in this way; the sales of honey from the groceries would not pay the advertising bill. It did not pay **me** to advertise this way.

Finally I hit upon a plan which has worked out so well that I give it here believing that many who live near the larger towns can use it to advantage, and the expense in advertising **is nothing.**

I go into a grocery store and say to the proprietor: "I have a honey proposition to make which I believe will interest you. If you can spare the use of your show window for a few days, I will put in a window display of fine extracted honey in jars of various sizes. I am not going to ask you to buy any honey. Simply place this display in your window with the prices marked on the different size bottles, watch the people stop, look at it and then come in and buy. After the display has been here as long as you wish to keep it, I will take the honey away and you can pay for what has been sold and as much more as you want to keep on hand."

The grocer usually says there is no use trying to sell the larger packages, the half-gallon and the gallon sizes. The ten-cent and twenty-cent sizes are as big as he can sell. In making this deal, however, I never contradict the grocer, for he naturally feels he knows far more about his business than I do, so I say, "That is true, but the gallon and the half-gallon make such an attractive display. They will help sell the smaller sizes." I know well enough, however, that the reason the larger ones have not sold is because people do not **see** them. Let people once get sight of the beautiful extracted honey and many of them will want a gallon.

The grocer always accepts this proposition because he is not asked to put any money into it that he is not sure of getting back at once. He has nothing to lose, no risk to take, and a new window display is always an attraction, so I am allowed to arrange a display similar to the one shown in the photograph.

People who come by the window stop and look at the display. Many come in and buy. Children look a long time at it and then go home to begin work on their mothers to get some of "that honey."

I first tried this at one of the largest groceries in the city, a dealer in fancy groceries. When I came to remove the display there was not much left to remove. He sold more honey in that week than he had sold in a year before. I put a display in a number of other stores soon after, with the same results. The honey sold like hot cakes.

One grocer has said, "You can put in the display if you want to, but do not expect too much. We have never sold extracted honey here. We can sell comb honey all right, but not the strained." I put in the display and it worked just as I knew it would, but it surprised the grocer. He left it in his window three weeks and I had to fill it in several times as the stock sold out.

I always explain to the grocers that after the display has been in the window and people know they can get honey there, it will build up for them a permanent demand for honey. This has proved to be true.

This scheme is the best of anything I have ever tried. If the producer has on hand plenty of honey, he may better have it in the show window advertising itself than to have it stored away in his honey-house.

Vincennes, Indiana.

Woman's Work in Food Conservation

By Mary G. Phillips.

IT is true that at last the woman in the kitchen has come into her own. For years our families have come to the table three times a day, have eaten with relish the good meals there, and have gone away without once thinking that in half an hour they have demolished what it took hours to plan, prepare and cook. Three bountiful meals have been taken for granted like sunshine and air, but now, at last, we are confronted with a new idea. We have suddenly waked to the fact that the health of the family depends absolutely upon the woman who plans what we shall eat, and prepares and cooks it. If you look around among your friends you will see that the children in one family are strong, vigorous and energetic, while those in another are weak, thin and unambitious. It may be that the mother, although a "good provider," has not for years given the children the food they need for proper growth and strength. I know of a family where the youngsters are given no milk (a most important food for children), and the chief meat is pork, a food exceedingly difficult for youthful stomachs to digest. No wonder that these boys and girls are undersized —they are undernourished.

Now, we housekeepers of today are not only recognized as the keepers of the family health, but we have a bigger responsibility even than that. We must keep our families healthy at home at the same time that we are sending all the food possible abroad. We are to help win the war! Isn't it a splendid feeling to know that we are a part of the United States army of women in a great drive **every day,** winning the war? "There is no magic way to make food win the war," says Mr. Hoover, "it can be done in but one way, the way of voluntary and eager resolution and action of the whole people in every shop and every kitchen and at every table in the land." Our trenches are our kitchens, our weapons the market basket and saucepan, and our ally cornmeal, but our victories are as real as though we flourished bayonets. So arm yourselves, housewives, and let us do our whole duty to our families and our country!

Of course every beekeeper is bending his energies toward the production of a maximum crop in 1918—that is part of his patriotic duty. The beekeeper's wife has her patriotic obligation, and I wish that the things which comprise her whole duty might be painted on every kitchen wall:

1. Keep the family well by the wise use of the right foods.
2. Save food for others by using less wheat, meat and sugar.
3. Waste nothing.
4. Prepare and cook food with thought and care.

The object of this article is to help the families of beekeepers to do these things and it should not be forgotten that every member of the family can help—it does not depend alone upon the mother, who does the planning and cooking. For instance, if Mother decides to have carrots for dinner and Father refuses to eat them, declaring they are nothing but rabbit food, he is hindering Mother's work and doing an unpatriotic act. What difference does it make whether he likes carrots or not? He can learn to eat them and be that much better off. Children can do their part by following the gospel of the clean plate, and they will, if they have been trained to like all wholesome foods. It is often difficult in after life to overcome food prejudices formed in youth, and now that we have an incentive by appealing to a child's patriotism, it will be possible to help them to form good food habits.

The need is immediate, and so urgent that we should set about our task now, not relaxing one day until the time comes when people are not starving by hundreds and thousands while we have plenty. Professor Jager, that splendid beeman of Minnesota, came back from Servia recently, and the stories he told of the hungry people there make one ashamed to use wheat, and more ashamed to grumble over having to use cornmeal. Just imagine, if you can, having nothing to eat for three years but a piece of bread daily as big as your fist, with a red pepper; bread so black and gritty that the teeth that bite on it become worn down to the gums. That is what thousands of Serbs are living on while we feel it a hardship to have one wheatless day a week! The workers in the Food Administration realize so fully that the saving of lives and the winning of the war can be accomplished by limiting our use of wheat, that one man there has insisted upon his family foregoing the use of wheat entirely, that there may be more for others. But after all, that man's sacrifice and his entire work of the Food Administration will go for naught, as will the work of all the missions helping to carry food abroad, unless we housewives do our utmost to co-operate. We must take hold of the food problem as we find it in the homes which we manage, and that means that we have three things to study—our

families, to find out what they need; our source of supply, to find out what we may use, and government publications, which will give us light on both. Aside from government bulletins, there is a mass of literature flooding the country today, which should be used cautiously, common sense dictating what to assimilate and what to disregard. Too frequently such literature is put together hastily by inexperienced "'food experts,' **and this is no time for experiments.** Food, we know, is scarce, and experiments often costly, therefore tried and tested methods that you know, are the best to use, unless you are sure of your source of information. Above all, let us use common sense. Here, for example, is a paper containing recipes for meat substitutes. In one wheat is used, elaborate preparation is necessary, and two hours' cooking is required, therefore much fuel. That sort of thing our common sense teaches us not to try, a good general rule being to have simple meals which require the least time in preparation, the least fuel to cook, and the least use of meat, wheat and sugar, yet conforming to the family needs.

Most of us are willing and earnest in our eflorts toward food conservation, but the difficult part is to keep up the effort day after day. It is easy to plan a meatless day and a wheatless day for a few weeks, but the strain comes when, without hope of receiving medals of honor, we have it to do week after week. The men in the trenches are relieved every few days and go behind the lines for rest. Our part is to keep on the firing line until the war is over. All honor to the housewife who does it cheerfully and gladly!

Washington, D. C.

My Neighbor's Garden

By C. D. Stuart.

STRAIGHT from the neighborhood of her garden flew my bees. I listened to catch some message from her in their gossipy murmurings, even as whiffs of fragrance, from magic-carpeted fields just beyond, came to me on the pinions of a brisk March wind. I could close my eyes and see that absurd little garden with its young gardener—my neighbor's daughter, and the apple of his eye—fussing over the one rose bush I myself had given to her, as Mother Eve might have tended the first infant in the world.

But all my mental tiptoeing failed to bring the message.

"We must be about our queen's business," those busy honey-gatherers ruled, thus cleverly passing back to me the problem of bridging the hostile trenches of parental jurisdiction.

One spinster bee, rather brazenly, I thought, dragged into a hive two bulging suit cases the color of new tan shoes. One could see at a glance that they had been stolen from a poppy field and that they had been tightly packed with crystals from the hearts of the poppies. I know the very place. In one corner of the field stands a live oak. There the young gardener and I met (quite by accident) and had worshipped the "land of fire" as the Spanish mariners who sailed up and down the coast in the early days, described the "flame" of Eschcholtzia Californica.

Of course, the bees do not mention the California poppy in botanical

WHITE OR FIELD MUSTARD. Sometimes called "Wild Turnip." (Photographed by John R. Douglass).

terms. Even the gardener feels more at home with its everyday name. But as that spinster bee, together with other spinsters, continued to drag into the hive other spick and span bulging suit cases, one could distinctly overhear in their excited humming, unanimous approval of the poppy, which only a poet may interpret.

" . . . Not all proud Seeba's queenly offerings
Could match the golden marvel of thy bloom . . .
Brimmed with the golden vintage of the sun."

Other spinsters, more decorous, with nectar hidden from public view, were drowsily chanting of the lupine intermingled with the poppies—"snowy and amethystine in seas of red bloom."

But only the gardener knows the intimate history of our flower which is kith and kin to that other flower whose essence has enslaved an entire nation, although she claims that our poppy has never been guilty of a greater offense than giving the Indian a few hours of happy forgetfulness, or, possibly, raising the hopes of certain elderly Spanish Californians who were wont to put their faith in a hair-restorer distilled from it.

It is clear, then, that bees, like other specialists, are limited by their occupations, as flowers appear to mean only nectar and pollen to them. On the other hand, the young gardener's fund of half--forgotten lore concerning all growing things, apparently is inexhaustible.

"The mustard's in bloom!" she had exclaimed only a few days before.

I smiled indulgently and looked in the direction of her gaze. Sure enough, a yellow haze was just beginning to tinge the orchards.

"The kind one buys with a ham sandwich?" I teased.

"Sandwich mustard grows taller and blooms much later," she corrected, and at once took my education firmly in hand.

"What's the difference?" I demanded. "Smells the same."

She broke off a piece and held it up to me. It had a brittle, reedy stalk and smooth, pale leaves. "Field or white mustard," she called it, and added, "'Some know it as wild turnip."

"Then what's this?" I triumphantly held up to her a plant with rough, hairy leaves, but with the same pale yellow flowers.

"Migra, or black mustard," she

ESCHOLTZIA CALIFORNICA
"On hills and plains, lifting, exultant, every kingly cup."

promptly retorted, and informed me that it was much used by our pioneer grandmothers as early "greens," and that in a similar manner the native Indians, long before pioneer days, had used the herbage of the California poppy.

But that is not all my young gardener knows. I say **my** gardener, for I am resolved that no other shall ever invade the walled garden of my bachelor heart. She has seen the poppies unfold, and laughed at the red-winged blackbird plunging down into the feathery depths of the mustard's lace-like foliage, or tilting about on the slender stems. She has watched the fields of pale green change into a magic carpet of "golden dust," as the flowers opened in the spring sunshine. She knows that but for the amber liquid distilled from those blossoms, young bees hatching in March would often go hungry to bed, or more probably would never hatch at all. Numbers of spinsters, the coveted liquid concealed on their persons, were, at that very moment, hurrying from her father's orchard back to the nursery.

Still another thing she knows. That wise little gardener is perfectly aware that they are my bees. We had once stolen out and watched the invaders taking their buccaneering way across the valley, plundered flowers swooning in their wake. I wondered if she ever watched my bees now. If only I could be certain! But why not find out? Surely one has the right to follow one's own property!

So I followed my bees, quickly, lest I should falter in traversing the intervening mile to the poppies, then on a little further to the mustard.

And there, knee-deep, in that magic carpet of inextricable fragrant network, stood my gardner—my magic girl with erect golden head matching the pale yellow flowers that filled her arms, waiting for the magic words she wished me to speak and that I had only been waiting the courage to pour into her small pink ear to perfect the magic of that wonderful spring day.

All around us hummed my bees. But we remained unobserved. Romance like ours is not for the Marthas of beedom. Los Gatos, Calif.

The Nutrition of the Honeybee

By R. Adams Dutcher
Division of Agricultural Biochemistry, University of Minnesota.

IF you had gone to the average biologist a few years ago and asked him the question "What are the facts regarding the nutrition of the honeybee" the chances are ten to one that he would have answered, "That is a chemical question; I am interested in the biological field and cannot answer your question." Had you then sought an answer to the same question from the chemist of that day he probably would have answered, "I am not acquainted with the anatomy and physiology of insects and it is a question upon which I have no knowledge. I am a chemist, not a biologist."

This viewpoint is fast disappearing, for, through the development of biological chemistry during the past few years the chemist is becoming more thoroughly a biologist and the biologist is becoming better versed in the fundamental sciences.

Our knowledge regarding the food of the honeybee and its functions is relatively meagre; in the short time allotted for this paper I shall merely indicate a few facts regarding our present knowledge of nutrition as applied to the higher animals and bring to your attention a few facts which may be of importance in the development of the honeybee.

Chemical analysis shows all living organisms to be composed of complex chemical substances which are being continuously broken down and rebuilt during the life of the organism. In order that the organism may best perform its natural functions it is necessary that the right kind of chemical materials be furnished in correct proportions and in sufficient quantity. The food is the source of these chemical materials.

The chemical substances which are present in the food materials of higher animals and which must be present for normal growth and development are (1-) the protein, (2) the fats, (3) the carbohydrates, (4) mineral salts, and (5) growth-stimulating substances sometimes known as vitamines.

The Proteins

This class of chemical compounds is characterized by a large proportion of nitrogen, which is valuable in building of muscle, nervous tissue, bone, cartilage, hair, and in the case of insects, the hard, sheli-like coat to which the softer tissues are attached. In Table I will be found a list of the important foods used by man and domestic animals in which the content of protein is expressed in per cent.

Table I—Protein Content of Some Common Foods

	Per cent.
Human Foods—	
Meat	16.00 to 20.00
Eggs	12.00 to 13.00
Cheese	24.00 to 26.00
Wheat	10.70 to 13.30
Rice	7.00 to 8.00
Potatoes	1.80 to 2.20
Milk	2.00 to 6.00
Stock Foods—	
Alfalfa Hay	14.00 to 18.00
Cottonseed Meal	40.00 to 42.00
Wheat Bran	14.00 to 16.00
Timothy Hay	2.50 to 3.50
Soy Beans	34.00 to 35.00
Bee Foods—	
Pollen	17.00 to 27.00
Honey	0.10 to 0.50

The Fats

These chemical substances function in the animal body as fuel materials, furnishing heat and energy. The typical fats used as human food are butter, lard, oleomargarine and the vegetable oils. It will be noted that the foods listed in Table II contain relatively small quantities of fat. This is not of great importance, for the animal is capable of manufacturing fats from carbohydrates.

Table II—Fat Content of Foods and Feeds

	Per cent
Milk	1.60 to 6.60
Beef	8.00 to 20.00
Fruits	0.20 to 1.50
Vegetables	0.10 to 0.70
Cereals	1.00 to 7.00

The Carbohydrates

This class of chemical substances also serves as fuel material in the animal body. The sugars, starches and gums are the most valuable carbohydrates and are found in the following foods:

Table III—Carbohydrate Content of Foods

	Per cent
Fruits	6.00 to 25.00
Vegetables	5.00 to 28.00
Corn Starch	89.00 to 91.00

A CALIFORNIA POPPY FIELD.

Cereals	65.00 to 78.00
Sugar (cane)	100.00
Maple Sugar	92.00 to 93.00
Honey	75.00 to 81.00

The Mineral Salts

In order to obtain the mineral elements necessary for normal life processes, the animal must receive a varied diet, for many foods are actually deficient in mineral matter. The mineral content of some common foods is given in Table IV.

Table IV—Mineral Content of Foods and Feeds

	Per cent
Corn	1.50
Starch	0.30
Sugar	None
Wheat	1.80
Wheat Flour	0.60
Rice Hulls	18.00 (96% is silica)
Oil Meals	5.00 to 8.00
Alfalfa Hay	7.40
Honey	0.18

Vitamines or Accessory Food Substances

In the last few years it has been found that certain food mixtures which contain sufficient quantities of protein, fat, carbohydrate and mineral matter, will not permit an animal to grow well unless certain chemical compounds are present. The nature of these substances is still unknown, but it has been found that such foods as butter fat, egg fat, milk, vegetables, fruits and certain grains contain these mysterious substances in relatively large amounts.

The Food of the Honeybee

In general, there are two types of food utilized by the honeybee, honey and pollen. Honey is manufactured by the bee from floral nectar and honeydew, the former being the more important from the commercial standpoint. The amount of nectar produced by the single flowers is very small and has led to much speculation regarding the number of flowers necessary to produce one pound of honey. The evidence would indicate that 50,000 to 1,000,000 flowers are required for this purpose.

Some of the older scientists studied the amount of honey carried by a single bee and concluded that a bee would have to make 2,500,000 trips to produce a pound of honey. Mr. Dadant has called my attention to the fact that this figure is much too high. He is of the opinion that a bee does not require more than 25,000 trips to accomplish this result, and this is in agreement with statements in ABC and XYZ of Beekeeping. According to the figures of Collin submitted by Mr. Dadant, the number of trips should be about 26,700; but this is assuming that the bee is carrying the concentrated honey. Analyses of floral nectars show the per cent of water to vary from that of honey (17 per cent) to more than 80 per cent. If the nectar contained 76 per cent of water, as indicated in Table V, the number of trips necessary to produce a pound of honey would be 3.46 times 26,700, or 92,382 trips. It is therefore safe to say that the bee will average (in round numbers) about 60,000 trips to produce a pound of honey.

Analyses of nectars from two different sources are given in Table V.

Table V.

Nectar.	Water.	Invert Sugar.	Cane Sugar.	Ash, Etc.
Hoya Carnosa	59.23	4.99	35.65	0.11
Honey Suckle	76.00	9.00	12.00	3.00

Table VI shows the total sugar content in Sainfoin nectar and the resulting honey.

Table VI.

	Cane Sugar.	Invert Sugar.
Sainfoin Nectar	57.20	42.80
Sainfoin Honey	8.20	91.80

There are two important changes which must take place before the nectar may be termed honey. First, the water content must be lowered by evaporation, and, Second (as shown in Table VI), the cane sugar must be broken down to the two simple sugars, glucose and fructose. This mixture of simple sugars is commonly known as invert sugar, or reducing sugar. The changing of sucrose or cane sugar to invert sugar is brought about by enzymes or ferments in the body of the bee.

(To be concluded in our next issue.)

Moving Bees

SEASONS like 1917, when but a few miles difference in location determined whether the crop was good or a failure, demonstrate very forcibly the importance of being prepared to move an apiary on short notice. To the beekeeper who is fully equipped, moving is not a serious matter, provided he has a suitable location to which he may go.

The replacing of the horse by the automobile has removed the most serious element of danger. Nine in every ten cases of misfortune in moving bees have been caused by the bees stinging the horses. If the hives get broken open on an auto, there is no trouble because of the necessity of unhitching frightened horses.

While in cases of long moves, it is necessary to use a freight car, most of the apiaries nowadays are moved by means of autos. A distance of fifty to a hundred miles can be covered at a less cost by motor truck than by freight, with a saving of time and with less injury to the bees. If the bees are to go into a car, it is necessary to haul them to the car, and again on unloading to haul them to the apiary site, so that they must be handled much oftener.

It is rather a simple matter to move an apiary by auto. However, two things must be looked after carefully, ventilation to prevent possible smothering of the bees, and protection from the effect of jarring, which might break the combs or throw them together in such a way as to crush the bees. To make sure of proper ventilation, every apiary should be provided with a sufficient number of moving screens for one load of hives. The moving screen is made of a shallow frame about an inch and a half in depth, just the size of the top of the hive, covered with wire netting the same as used for fly screens. In moving, the top is removed from the hive and the screen put on its place and fastened with staples made for the purpose. With the entire top open, and a clustering space an inch or more in depth, there is little danger of smothering except in extremely hot weather. At such times it may be desirable to put a similar screen on the bottom of the hive in place of the regular bottom-board, and leave a small space between the hive and the bed of the auto. Strips should be across the hives before a second tier is piled on them, to provide for a sufficient circulation of air. Piled up in this way, the bees can be moved on a hot day with little dan-

AN APIARY THAT WAS MOVED FIFTY MILES BY OUR STAFF CORRESPONDENT WITHOUT LOSING A COLONY OR BREAKING A COMB.

ger, since there is a current of air as soon as the car is on the move.

A still better and safer plan, when the bees are to be handled by people who may not be aware of the danger of smothering them or of tearing the screen and allowing them to escape and perhaps cause accidents, is to nail over the screen, at each end, strips an inch in width and thickness, and over these strips nail a board which will thus protect the screen and also shade the bees from the direct rays of the sun, in case the hive was exposed to them at any time. The ventilation then comes over the screen from both sides. A similar protection may be used at the bottom. There is then no danger of the bees being smothered by the too close piling of the hives on one another.

After trying various plans of fastening the frames to prevent jarring, the writer prefers the use of paper, as suggested by J. L. Byer, of Canada. Where the Hoffman self-spacing frames are used, it is an easy matter to move, since the frames will be sufficiently rigid without special preparation. Loose hanging frames would very quickly be loosened by the motion, and disaster would attend the moving if they were left unfastened. If a pile of old newspapers is handy, one can prepare a hive in a very few minutes by crushing a small roll of paper into the spaces between the tops of the frames. It is surprising how solid they will be if paper is placed between the frames at each end, and how nicely they will take a long journey. The apiary shown on the big truck in the illustration was moved fifty miles, without the loss of a single colony or damage to a single comb.

In loading the hives on the truck, the frames should be placed crosswise of the car, as the jar will be from sidewise motion. In loading a freight car the frames should run endwise of the car, since the jar will come from bumping the cars from the ends.

If one has new hives and good moving screens, it is a simple matter to close up the hives in preparation for moving. If the hives are old and the screens do not fit well, newspapers come into play to close up all holes, and serve the purpose admirably. It is well to put on all moving screens the afternoon before the bees are to be moved, and leave the entrances of the hives open as usual. After the bees have stopped flying at night, the entrances can be closed, and the bees will be ready for an early start the following morning.

When releasing bees in a new spot, it is very important that they should realize the change of location, so they may reconnoiter, in a manner similar to the first flight of the young bees, and learn the location of their new abode. When they have been transported long distances they realize the unnatural conditions and make the usual circles about the entrance. But if carried only a short distance with much care, and if they have been set down upon their new stand at night, some of them may, the next day, take flight without looking behind. To avoid this we use a slanting board or some other obstruction in front of the entrance, so that they may at once notice that things are not as they were. After the first flight there will be no danger.

Efficiency in Beekeeping

By Morley Pettit.

THERE is a word to conjure by in production. It nearly won the war for Germany; humanly speaking, it will win the war for the Allies. That word **is Efficiency.**

The idea has revolutionized manufacturing and business. It is now revolutionizing beekeeping. What is it?

A negro went to the bush for wood. He stopped his mule-wagon ten feet from the pile while he loaded it, walking back and forth. When he had enough in the box for his old woman to get dinner, he drove home. That was not efficiency. To drive close and eliminate carrying, to load well and avoid extra trips would be a step in that direction.

Every task requires certain operations and each operation certain motions. To study to reduce the number of operations and of motions, thus saving time and energy, is the mechanical side of efficiency. Every thoughtful beekeeper is doing it more or less. He calls the result "short cuts." Sometimes they are not the surest way home.

Carried to its extreme, efficiency makes machines of men. Repeating the same operation day after day and week after week destroys constructive thought and separates the daily task from the joy-of-doing which should accompany it. In beekeeping this cannot be. Seasonal changes make it impossible. Varying conditions make even good system difficult, but all the more desirable. Systematically performed, the daily tasks of beekeeping become a joy of constructive thought and of purposes accomplished. Even when seasonable conditions spoil results, plans and preparations immediately go forward to "next year," when better returns are expected.

At its worst, commercial beekeeping is a series of little pottering jobs done to scores or hundreds of colonies. At its best, it is a system by which each colony is intelligently given necessary attention at regular intervals being determined by the beekeeper's judgment of seasonal weather and colony conditions. The beekeeping expert is the doctor and each colony is a patient. The doctor must have his science and his system and then vary the application of them to individual needs. He may employ several pairs of unskilled hands in the process, to lift and fetch and carry, but **his** part cannot be well done by rule or proxy.

In other words, beekeeping efficiency is very different from mechanical efficiency. Very few operations in the actual care of bees have been successfully standardized or reduced to rule of thumb. That is where the novice fails when he reads how Mr. —— does so and so. He tries to do likewise, misses important points which Mr. —— probably observed unconsciously and failed to record, and mentally charges Mr.—— with incompetency. The real reason for his failure might be charged to lack of experience. It might also be charged to lack of analysis and proper expression on the part of Mr. ——.

When beekeepers learn "experience" instead of, or experience with, methods, they learn to judge the methods of others and to devise methods which will suit their own conditions best. They also learn to vary from colony to colony and from day to day, yes, and from season to season, the application of their standard methods according to conditions which are found to exist.

This "experience" is known to be of paramount importance, and according to tradition, is to be had only after many years of unprofitable labor, by allowing a very small apiary to grow only as experience grows. However that may be, it is the fundamental knowledge on which all successful beekeeping practice is based. Not many who have obtained it by the laborious process are able to reduce it to language. They are like the old cook who was asked for the recipe of a certain delicious cake she made. "Wall, Honey," she said, "if you-all put in the things that I put in, and mix them the way I mix them, you'll have as good cakes as I make." They attempt to convey their experience in terms of methods and appliances, and they succeed to a limited extent in the hearing of other experienced beekeepers.

If all the experience or knowledge of bees and the conditions related to their "keeping" now in the minds, mostly subconsciously, of successful beekeepers were reduced to language abstracted from unimportant details of multifarious methods, if this were published and every honey producer led to read and digest it, the development of the industry would be phenomenal.

Let me put this in another way. Beekeeping is keeping bees—delicate insects, extremely complex organisms, highly sensitive to stimuli such as light, temperature, humidity, electricity, vibration, air currents, odors —to a thousand phases of environment not named or not determined. Their activities are subject to these and to numerous physiological and colony conditions which multiply variations of behavior and complicate control.

Man has not learned to change appreciably bee-nature by breeding. The multitude of individuals and the brief life-span of each precludes any attempt at training bees, were such a thing possible. In common parlance my bees do not "get to know me." I try to know something about them. The extent of my knowledge

of them limits my success in "keeping" them.

Efficiency in beekeeping, then, falls under two heads: on the one hand a knowledge of bee-nature, with the means of preventing undesirable behavior, such as swarming or dying in winter, and of promoting behavior which is to be desired; on the other hand, the simplifying of these "means" so as to obtain the best results with the least expenditure of time and energy.

I have said that methods of bee management cannot be standardized. I will say now that they **must** be standardized. Before the busy season opens I must have definite plans as to how I am going to proceed to control or prevent every phase of undesirable behavior, and to promote all bee behavior which is to be desired. That every colony may have its fair share of attention the days for visiting each apiary at regular intervals must be arranged **by the calendar** well in advance. Even internal conditions which may be found in various colonies on different periodical examinations may be classified and the treatment each shall receive determined. It is true that these conditions will shade off into one another and that their treatment will depend on conditions and trends of the season; but the previously thought out plans will be a guide, though not a rule, of action.

Efficiency in a seasonal occupation like beekeeping makes the most of each season in turn. In the swarming season, for instance, swarm-prevention has the pre-eminence. I have no time to extract during a northern clover flow. If I spent half my time extracting then I would know that with an adequate supply of supers I might manage almost twice as many bees with a chance of doubling my crop. I would be sure that tiering up would improve my honey, besides distributing the labor. A study of the average beekeeper's season would show that much of the work of his busy time could be done before and after.

Efficiency seeks definite knowledge and mastery of the situation. I can learn to judge of colony conditions to a limited extent by studying the flight of bees at the entrance. But diagnosis is uncertain, leading to haphazard methods or a wholesale application of radical treatment, both of which are undesirable. A thorough examination of each colony at stated intervals gives individual attention and provides the occasion for all the manipulations necessary for securing a crop and leaving each in the best condition for winter.

Hives, buildings and appliances are tools used in the production of honey. They are as important as the tools used in the factory or on the farm. Hives deserve special consideration because bees use them as well as men.

Georgetown, Ontario.

BEE-KEEPING FOR WOMEN

Conducted by MISS EMMA M. WILSON, Marengo, Ill.

Racing the Stingers

While speaking of stings I want to tell an adventure I had several summers ago, no repetition of which is desired. It was at a time when the main honey flows in this vicinity were over and there would be a period of three to four weeks with nothing doing until goldenrod and asters came into bloom.

So I conceived the idea of taking one hive to a location six miles away beside a large pond surrounded with clethra, commonly known as white alder or pepper bush.

This bush secretes a large amount of nectar, of which the bees are very fond, and was just starting to bloom.

So I closed the entrance of a hive tight and secure, as I thought, hoisted it into the back of a buggy and started off alone. I had gone about a quarter of a mile when I felt a sting on the back of my neck. Leaning back, what was my horror to see the bees tumbling out through a small opening in the entrance, which must have been made by something joggling loose as we drove along.

I tried my best to throw a light laprobe over the hive, but by that time the bees were beginning to get acquainted with the horse, with the result that I had to devote my attention to the reins. I couldn't stop to take out the hive because it was only by galloping the horse that the bees could be kept at all at bay.

Even at that, they hurled themselves like little javelins at us. Afterward thirty-eight stings were counted on the back of my neck!

I knew if I slowed up they were likely to get the upper hand and perhaps sting us both to death. So on we went, finally swinging round a circle in a neighbor's yard and heading for home. Luckily a man was beside the roadside pump in front of the stable, and it took only a jiffy to throw a blanket over the now crazy, plunging horse, unharness and rush him into the stable and shut everything up.

Those bees continued to rage riotously all morning, issuing from the hive in streams.

Later I managed, all bundled up in coats, bloomers and gloves, to get them back to their old stand.

It was a more fortunate ending than I deserved for such carelessness, but at any rate I learned from that experience that to be a successful beekeeper you must not just **think** things are right—you must **know** they are!

JOSEPHINE MORSE,
In Country Gentleman.

Honey Gingerbread

½ cup sour milk.
1 cup extracted honey.
1½ teaspoons soda.
1 level tablespoonful ginger.
½cup lard or fats.
2 eggs well beaten.

Flour to make thin batter. Mix soda with sour milk and add rest as listed. Bake in moderate oven 45 to 60 minutes, in shallow pan.

If when making light bread, by omitting lard and sugar and using the same amount of honey, you will find a great improvement in flavor.

MRS. MARY KING.

Nourishment in Honey

(Mary A. Porter, in "Good Health.")

In early times, until cane sugar was introduced from the tropics, honey was the most common sweet substance available for food in the temperate zone. Before beekeeping gave a better and more economical supply, the wild honey found in rock crevices and in old trees was highly prized. Wild honey is still gathered in some countries, and in Peru it is an important export. Floral or normal honey is made from nectar, a sweet liquid secreted by flowers. The flavor and aroma of the honey depend upon the blossoms from which the bees extract the nectar. Each flower secretes its own combination of oils and substances, which give the blossoms their special fragrance. This peculiar flavor is detected in the honey—clover, buckwheat, fruit blossoms, etc. There is a choice variety of French honey from Narbonne which has the flavor of wild thyme and other mints. In districts where oranges grow, we get an orange blossom honey.

It is the custom of dealers to mix several honeys in order to produce a blend that is usually more satisfactory than an unmixed honey of pronounced flavor.

Honey extracted from the comb is easily adulterated, but the pure food legislation has made such adulteration dangerous and unprofitable, and for this reason the strained honey on the market is largely pure.

Like most foods, honey varies more or less from its average composition. The syrup contains about four parts sugar to one of water. There are several kinds of sugars present in honey, for the most part grape sugar and fruit sugar.

Honey also contains a small amount of magnesia, lime, phosphoric acid, iron and protein; ;however, the sugar so largely predominates that the food value of the other ingredients need not be considered.

In choosing honey, too much importance should not be attached to lightness of color, for some of the best varieties are dark.

How to Keep It

Honey should be kept in a dry place in the house, otherwise it is likely to absorb moisture and spoil.

It should not be kept in a cold place, and never in the refrigerator.

The chemical change effected by the bee in the sugars of the nectar is the same as that produced by digestive ferments. The honey sugar has, therefore, undergone the first stage of digestion. It is because of this predigestion that honey is more wholesome than cane sugar. Eating too much honey will upset digestion, but not so soon as when too much ordinary sugar is eaten. Too much of either should, of course, be avoided.

Whether strained honey or comb honey is eaten, is a matter of choice. For those with delicate digestion, the particles of wax in comb honey may cause trouble, but for normal persons such small bits of wax as may be swallowed are as harmless as are the particles of indigestible material in many other foods.

Honey has a mildly laxative effect. Bran biscuits made with honey are more laxative than the ordinary bran biscuit. Older writers have claimed medicinal properties for honey, but this is largely a matter of tradition. Honey is a food and not a medicine. It is worthy of much more extended use, especially in cooking, because of its agreeable and economical features as well as because of its wholesomeness.

The simplest way of using honey is to serve it like jam or syrup with bread, breakfast cereals, rice, pancakes and other mild-flavored foods. When used on bread, an ounce of honey spreads as many slices as an ounce of jam. When it is to be used as a syrup on cakes, etc., if diluted with a little hot water, it is less sweet and also easier to pour.

Honey can be satisfactorily used for sweetening lemonade and other fruit drinks. Syrup of any kind is more convenient for this purpose than undissolved sugar. Honey can be used in place of sugar for some kinds of preserving, and fruits cooked in it keep very well, indeed.

With Currants

Currants cooked in honey served with cream cheese and crackers or bread make a delicious lunch dish that is also very nutritious. Honey may be substituted for molasses in cookery, as it is slightly acid. It can be used in place of molasses in all kinds of breads, muffins and cakes, and it makes a more delicately flavored product.

A cupful of honey will sweeten a dish just about the same as a cupful of sugar. As there is about one-fourth of a cupful of water in a cup of honey, one should use one-fourth less liquid than the recipe calls for when using honey in place of sugar. No special honey recipes are necessary for making cake, as the substitution of honey for sugar is all that is necessary. And honey used in the place of sugar keeps the cake moist longer. A honey cake made with butter will keep its quality until the butter grows rancid, while one made without butter will keep fresh for months and even improve its flavor. What is true of the cakes, is also true of the dough; it can be kept almost indefinitely.

Many recipes for making cake with honey in the older cook books are very elaborate, and usually direct the honey be brought to the boiling point and then skimmed and cooled. This custom of boiling probably was necessary when the honey was much less carefully prepared than at present, and when it contained impurities of many kinds. As a matter of fact, a cake made by stirring flour directly into cold honey is in no way inferior to cakes made with honey that has been heated.

Icing made with honey, or with part honey and part sugar has the same advantage that honey cakes have. It keeps soft and in good condition for a long time. Honey is not often used in bread making, but there is no reason why it may not be used in place of molasses or sugar in varieties of bread that call for such sweetening.

A few honey recipes are here given, all of them highly nutritious and suitable for children as well as for adults:

Baked Honey Custard

5 eggs.
½ cup honey.
4 cups scalded milk.
⅛ teaspoonful powdered cinnamon.
¼ teaspoon salt.

Beat the eggs sufficiently to unite the yolks and whites, but not enough to make them foamy. Add the other ingredients and bake in cups or in a large pan in a moderate oven. The baking dishes should be set in water.

Boiled Honey Custard

2 cups milk.
3 egg yolks.
1-3 cup honey.
⅛ teaspoon salt.

Mix the honey, eggs and salt. Scald the milk and pour it over the eggs. Cook in a double boiler until the mixture thickens. This custard is suitable for use in place of cream on gelatin desserts, or to be poured over sliced oranges or stewed fruit.

Honey Pudding

½ cup honey.
6 oz. bread crumbs.
½ cup milk.
Rind of half a lemon.
½ teaspoon ginger.
2 egg yolks.
2 tablespoons butter.
Two egg whites.

Mix the honey and the bread crumbs and add the milk, seasonings and yolks of the eggs. Beat the mixture thoroughly and then add the butter and the whites of the eggs well beaten. Steam for about two hours in a pudding mold which is not more than three-quarters full.

Rolled Honey Wafers

¼ cup butter.
⅞ cup flour.
¾ cup honey.

Mix together the butter and honey and add the flour, sifted with the spice. Spread out very thin with a broad, long-bladed knife or spatula on a buttered, inverted dripping pan, or on flat tins made for the purpose. Mark off in three-inch squares and bake in a slow oven until delicately browned. While warm, roll in tubular shape and hold until they are cool and, if necessary, until they harden into shape. Honey wafers are not quite so tender as those made with sugar.

Honey Mousse

4 eggs.
1 pint cream.
1 cup hot, delicately flavored honey.

Beat the eggs slightly, and slowly pour over them the hot honey. Cook until the mixture thickens. When it is cool, add the cream whipped. Put the mixture into a mold, pack in salt and ice, and let it stand three or four hours.

Yellow Honey Cake

½ cup sugar.
2 egg yolks.
2-3 cup honey.
¼ teaspoon cinnamon.
1½ cups flour.

Sift together the flour and the spice. Mix the sugar and egg yolks, add the honey, and then the flour gradually. Roll out thin, moisten the surface with egg white, and mark into small squares. Bake in a moderate oven.

Honey Sponge Cake

½ cup sugar.
½ cup honey.
4 eggs.
1 cup sifted flour.

Mix the sugar and honey and boil until the syrup will spin a thread when dropped from the spoon. Pour the syrup over the yolks of the eggs, which have been beaten until light. Beat this mixture until cold; then add the flour, and cut and fold the beaten whites of the eggs into the mixture. Bake for forty or fifty minutes in a pan lined with buttered paper, in a slow oven.

This cake can be made with a cupful of unheated honey in place of the honey and syrup, but the quality is not quite so good.

Breakfast Marmalades
(Sugarless)

As a butter saver, Americans might adopt the English custom of serving marmalade with toast or hot bread for breakfast. Let the fruit supply the sugar to be used in making these marmalades. Their virtue lies in the tartness of the fruit and the fact that they contain only what nature put in the fruits.

Apple-Raisin Marmalade

To one cup ground seeded raisins add one cup chopped apples and one cup of water. Cook until thickened. A little orange and lemon juice and grated rind may be added if liked.

Cooked dried fruit, as apricots, pears, peaches, or prunes may be used in combination with the ground raisins in any proportion desired, and three fruits combined as apricots, apples and raisins.

Catsup added to the marmalades makes a simple fruit relish to serve with cold meat.

Date-Prune Jam

Wash one pound prunes, soak over night; cook in same water and remove stones. Remove stones from one pound dates and cut in small pieces. Cook with prunes until mixture is thick Add small amount of lemon juice.

Prune-Apricot Butter

Wash one pound prunes and one-

half pound apricots; soak over night; stew until very soft in same water; rub through colander; return to sauce pan and cook slowly until thick like apple butter, being careful that it does not burn. Do not add sugar.

In what way are taxes on bees assessed in Iowa? How much per colony? IOWA.

Under the Iowa law ten colonies of bees are exempt from taxation. Any number above ten colonies are given in to the assessor the same as other property, and they are taxed according to their value. The assessor fixes the valuation. The rate of taxation varies according to the levy of your county.

Can you give me information regarding the present law relating to foulbrood? IOWA.

The new Iowa law relating to bee inspectors reads:

"Upon written request of one or more beekeepers in any county of the State, said apiarist shall examine the bees in that locality suspected of being affected with foulbrood or any other contagious or infectious disease common to bees. If, upon examination, the said apiarist finds said bees to be diseased, he shall furnish the owner or person in charge of said apiary with full written instructions as to the nature of the disease and the best method of treating same, which information shall be without cost to the owner.

"Sec. 3. Anyone who knowingly sells, barters or gives away, moves or allows to be moved, a diseased colony or colonies of bees without the consent of the State Apiarist, or exposes any infected honey or infected appliances to the bees, or who willfully fails or neglects to give proper treatment to diseased colonies shall be deemed guilty of misdemeanor, and upon conviction thereof before any justice of peace of the county, shall be fined not exceeding the sum of fifty dollars, or imprisonment in the county jail not exceeding thirty days. days."

Mr. Eric Millen, Ames, Iowa, is the State Apiarist in charge of this work, and all letters of enquiry should be addressed to him.

Agreement for Working Bees on Shares

Will you give a working agreement to cover the following:

I am to work bees on shares next year, the owner to furnish the bees just as they are. I do all the work, furnish my own tools, provide my own board, etc. All honey and beeswax is to be shared half and half, each to furnish containers for his own share. The owner of the bees is to furnish all extra supers necessary. All natural increase is to be equally divided, each to furnish one-half of the necessary hives.

It is very desirable that such agreements as the above be reduced to writing and that each party shall retain a copy to avoid possible misunderstanding. This seems to be a case where everything is explicitly provided for. The following is a simple form:

This agreement, made on this 10th day of December, 1917, by and between John Smith and Stephen Brown, witnesseth:

That the said John Smith hereby agrees to lease to Stephen Brown 200 colonies of bees together with the hives and equipment and to furnish such extra supers as may be necessary to harvest the crop, for the season of 1918.

The said Stephen Brown agrees to give careful and promt attention to the said bees, to use due care to guard against disease, and if disease be found at any time to give proper treatment therefor; to use diligence in saving all swarms that may issue, to provide necessary stores for needy colonies, and to perform all other necessary labor in the harvesting of the honey crop and attending to the usual work of the apiary. At the close of the season he further agrees to return to John Smith the full number of colonies provided with sufficient stores for the coming winter; provided, however, that he shall not be responsible for losses caused by tornadoes, storms or other causes beyond his control.

It is further mutually agreed that all surplus honey and wax shall be equally divided between John Smith and Stephen Brown, and that each shall furnish the necessary containers for his own portion; also that all increase shall be likewise equally divided and that each shall furnish one-half of the necessary hives therefor, and that the said Stephen Brown shall furnish his own tools, provide for his own board and other expenses and that the said John Smith shall not be held liable for any exenses except as herein provided.

Signed this 10th day of December, 1917.

JOHN SMITH.
STEPHEN BROWN.

Bee Meetings in Michigan.—Mr. P. W. Erbaugh, a former deputy of the office of the State Inspector of Apiaries, now a Special Agent of the Federal Bureau of Entomology, has been assigned to work in Michigan for the time being. In co-operation with him a series of county meetings were arranged for January. To date we have held meetings at the following places: Marshall, Mason, Williamston. Munith, Adrian, Hillsdale, Coldwater, White Pigeon, Fenton, Birmingham and Ypsilanti. One of the objects of these meetings is the organization of County Beekeepers' Associations. The following counties organized associations with officers as follows:

Hillsdale County—President, E. A. Leffingwell, Allen; Vice President, Clyde Godfrey, Jonesville; Secretary-Treasurer, Vern Haskins, Osseo.

Oakland County—President, Arthur Houghton, Pontiac; Vice President, W. L. Lovejoy, Clarkston; Secretary-Treasurer, Miss A. Sly, Birmingham.

Washtenaw County — President, Floyd Markham, Ypsilanti; Vice President, E. B. Manwaring, Ann Arbor; Secretary-Treasurer, E. Ewell, Ypsilanti.

A number of other county organizations have been formed previously. The following places are scheduled for meetings during the rest of the month: Jackson, E. Lansing, Grand Rapids, Scottville, Big Bear Lake, Elk Rapids, Traverse City, Tawas City, Caro, Bay City, Saginaw and Owosso.

The severe storms experienced here have interfered somewhat with the attendance, but all meetings have been held as scheduled. The attendance has been very satisfactory. The matter of organization has been taken up enthusiastically and the fact that interested and public-spirited beekeepers have been made the officers of the associations insures the success of the organizations. In many places beekeepers have taken part on the programs. Mr. Erbaugh and the State Inspector have spoken on "Wintering," "Spring Management," "Swarm Control," "The Necessity of Increased Production," "Foulbrood" and "Extracted Honey Production." Beekeepers have been urged to increase their production through more efficient methods, by increasing their number of colonies, by buying or renting unproductive colonies, by producing extracted honey instead of comb, by proper winter protection and proper attention during the spring time and by co-operating in the control of bee diseases.

The results of these meetings are of permanent value to the State. Many beekeepers have been brought to the meetings who have never before attended a meeting where apicultural subjects have been discussed. All have been urged to ask questions and to discuss fundamental problems freely, with the result that many persons attending expressed their determination to increase their efficiency and profit by the new ideas gained. It will be necessary to discontinue these meetings during the month of February because the State Inspector also teaches Apiculture in the Agricultural College. The work will be taken up again in March.

B. F. KINDIG,
State Inspector of Apiaries.

Sweet Clover Seed in Demand.—According to the "Seed Reporter" of the Bureau of Markets, Department of Agriculture, Washington, D. C., sweet clover seed is scarce this year and the prices rule high. The reporter says: "The crop is reported very short and dealers have been scouring the country for available supplies, with but little forthcoming. The stocks on hand are very low and inadequate to meet the spring demand. Hulled white sweet clover seed is being quoted in a limited

way at from $20 to $25 per hundred pounds."

What a change in a few years. The poor, despised sweet clover is at last coming into its own. The time should not be far off when beekeepers will begin to notice the effect of the increased plantings by additional forage for their bees. This is true already in the South and many parts of the west. Should this clover supplant the red clover, it will become true almost everywhere.

West Virginia Meeting.—The Pan Handle Beekeepers' Association will hold their spring meeting March 27, Market Auditorium, Wheeling, W. Va., and in all probability the West Virginia State Beekeepers will hold their annual meeting at the same place on March 28, which will make a two-day meeting. The following persons will be present to address the meetings: Mr. T. K. Massie, President of the West Virginia State Association will have and demonstrate the Massie hive. Mr. Adam J. Yahn will have a Langstroth hive and will demonstrate the proper way of putting the Langstroth together. Mr. Yahn is one of our deputy inspectors and he tells me that it is surprising how many people do not know how to assemble a Langstroth hive. Mr. W. E. Seaman will give us a talk on sweet clover, the benefit it is to the beekeeper, how the farmer can get bigger and better crops by growing sweet clover, its qualities for rebuilding our already too poor farms.

W. C. GRIFFITH, Sec'y.

Tupelo Honey Exchange.—In our January number we gave an account of the formation of the Tupelo Honey Exchange in Florida. Since then we have received added information which we give to our readers.

It takes the form of a stock company, its members owning the majority of stock.

They have applied for charter under the laws of Florida with main office at Wenwahitchka, at which place a majority of the producers live, and a branch office at Cordele, Ga., which is the main shipping point of tupelo honey of the South.

The object of this organization is to sell its output through one medium or seller and at a uniform price. If beekeeping has a great future in the South it is in this tupelo gum section and it is hoped through the efforts of this organization to promote it greatly.

In the past, beekeepers living remote knew but little about the honey market and they sold for what they were offered, all the way from 5c to 10c per pound. This has had its effect on the industry there which was very serious and accounts for the slow progress until a few years ago. But its growth has been wonderful of late and with this help it is hoped many more locations in this great belt will be stocked with bees, even by those who are already in the field.

Tupelo gum honey never granulates. Added to this feature its quality for domestic use cannot be excelled by any southern honey.

W. M. Whitney Dead.—We failed to chronicle the death of Mr. W. M. Whitney, of Evanston, which occurred on November 21, last, at the advanced age of 89 years.

Mr. Whitney was a familiar figure at the Northwestern Association meetings in Chicago each year, where

THE LATE W. M. WHITNEY

he took prominent part in the discussions.

Always an enthusiastic beekeeper, and to the last a progressive one, he will be missed from the ranks of his profession. He had been a beekeeper for many years.

Extracted or Comb?—Professor L. V. France, of the University of Minnesota, sends us the following information concerning the courses of beekeeping at the Agricultural College and the opinions expressed by the students concerning the desirability of comb versus extracted honey production. Thirty-seven students were given the question, "Shall I produce comb or extracted honey?" The replies were as follows:

Before 1918—

For comb honey	11
For extracted	26

For 1918—

For comb honey	2
For extracted	35

Mr. France adds: "These students appreciate not only the advantages of extracted honey production over that of comb honey, but also the special present war situation requiring the increased production of extracted honey."

Pushing Extension Work.—The new office of State Apiarist in Iowa is getting the work well started. The beekeepers of that State asked for extension work for four years before they could get it. When the new inspection law was passed it provided for extension work also. Prof. F. E. Millen was appointed State Apiarist and has all such work in charge. He has been holding meetings at numerous points in the State during the past weeks, including a short course at the college during the Farmers' week roundup. A correspondence course is announced to reach those not in position to take advanntage of the regular courses. Iowa beekeepers are much gratified with the way the new official is taking hold of the work. A series of field meetings and apiary demonstrations are planned for next summer. Any Iowa beekeeper who wishes an apiary demonstration held in his neighborhood should communicate with Prof. Millen, at Ames, as early as possible, since he will have a busy season.

A Michigan Meeting.—The beekeepers of Branch county gathered at the court house at Coldwater, Mich., on January 10 for a one-day beekeeping school. The speakers were B. F. Kindig, State Inspector; Mr. Leffingwell, of Allen, and Mr. Erbaugh, of the extension service. Mr. Kindig spoke on feeding and how to secure sugar for feeding bees; he also talked on foulbrood. Mr. Leffingwell spoke on the production of extracted honey and Mr Erbaugh on wintering and swarming. About forty were present.

CHAS. GALLOP.

New Man at Ames.—Mr. E. M. Atkins has resigned his position with Prof. Webster at the Iowa Agricultural College to enter extension work in the government service. Mr. Wallace Park, of Manhattan, Kans., has been appointed to succeed him in charge of experimental work in apiculture and has already started with the work.

UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Markets

Semi-Monthly Market News Bulletin

Honey arrivals since last report:

Medina, Ohio.—1,789 pounds Michigan.

Keokuk, Iowa.—No fresh arrivals.

Hamilton, Ill.—No fresh arrivals.

Markets—Jobbing Prices

(In many markets in the honey trade the term "jobber" is commonly applied to the original receiver who buys direct from the grower in carlot quantities. However, in these reports we use the term "wholesale carlot receiver" to designate the carlot purchaser, while the term "jobber" refers to the dealer who buys in less than carlot quantities from the carlot receiver and who sells direct to retailers. The prices quoted in this report represent the prices at which the "wholesale carlot receivers" sell to the "jobbers.")

Note: Arrivals include receipts during preceding two weeks. Prices represent current quotations.

St. Louis.—Comb honey: No supplies; extracted, supplies light. Cans, bright amber 16-18c per pound; dark amber 15c. Beeswax; no sales reported.

Denver.—Comb honey: receipts very light. Extracted, approximately 27,000 pounds arrived. Comb honey: sup

plies practically exhausted; no sales reported. Extracted honey: demand and movement good; white to light amber 16-17c per pound. Beeswax: receipts light; price to producer, yellow, 38c per pound.

New York.—Arrivals: 30 barrels, 25 casks Porto Rico, 3 barrels Santo Domingo, 675 barrels Cuba, 177 barrels Chile, report probably incomplete. Local demand moderate, market steady; export demand good, but hard to secure ship space. Extracted honey: domestic light, best 20-22c per pound; West Indian light, 19-20c; dark, 17-18c per pound. Beeswax: 104 bags, 12 boxes Porto Rico, 5 bags South American arrived; demand good, market strengthening. West Indian, yellow, 39-40c per pound; dark, 37½-38½c.

Cincinnati.—Extracted honey: one California arrived; local receipts very light; demand good, market firm, movement moderate on account of high prices; domestic, light amber 17-18c; orange and white sage, 22c. Comb honey: supplies practically exhausted; demand and movement good, market strong; fancy white heavy, $5.50; No. 1 white heavy, $5.25 per 24-sectional case. Beeswax: demand and movement good; market strong; average yellow, 43-45c per pound.

Chicago.—No fresh carlot arrivals. Receipts very light. Supplies very light. Stock from nearby States: Comb honey, best 23-25c per pound. Extracted honey, best 17-18c per pound.

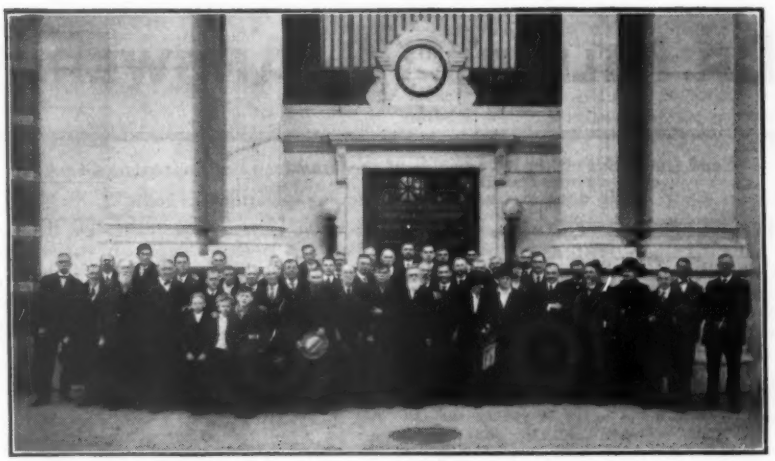
Philadelphia.—360 cases comb from Vermont arrived. Practically no demand or movement; market very strong; very few sales. Comb honey: Vermant, amber $5 per 24-section; case; dark amber, $4.75. Extracted honey: no arrivals; no sales reported. Beeswax: No arrivals; no sales.

Kansas City.—No carlot shipments arriving. Demand limited; movement slow; market strong; few sales, all sales in small lots. Extracted honey: jobbing prices, California and Colorado, white and light amber, 17-18c; dark, 14½-15½c. Comb honey: sales direct to retailers, Californias, 24-section cases, No. 1, $5.50; native 24-section flat cases, No. 1, mostly $6. Beeswax: no fresh arrivals. Buyers paying 35-40c per pound.

Minneapolis.—No arrivals. Supplies very light. Demand moderate; market firm. Comb honey: 24-section cases Minnesota white, best, few sales at 18-19c, mostly 18c per pound; Colorado white, mostly at $5.50. Extracted honey: Minnesota, 60-lb. cans, best mostly 19c per pound. Beeswax: no sales.

St. Paul.—No arrivals reported. Supplies very light. Demand moderate; market firm. Comb honey: Minnesota, 24-section cases, fancy white, $5.50; No. 1 mostly at $5. Extracted honey: no sales reported. Beeswax: no sales.

Manual of North Carolina Association.—The first manual of the North Carolina State Beekeepers' Association is just out. It is a pamphlet of 24-pages giving a history of the formation of the association, its constitution and by-laws, recommendations and general information.



MEMBERS IN ATTENDANCE AT THE NORTH CAROLINA MEETING. THIS STATE IS FAST BECOMING A "PROGRESSIVE" IN BEEKEEPING RANKS.

The association unqualifiedly indorsed movable-frame hives, Italian bees, extension work, more care of bees, bee clubs for boys, specialization in one branch of beekeeping.

There is then given a summary of educational extension work done, list of dealers where standard supplies can be obtained, names of bee journals and bee-book publishers, a plan of meetings, and list of members of the association.

North Carolina ranks among the first of States in number of bees. Up to the last year or two very few of these bees, however, were in anything but box-hives. With the wide-awake organization they have now and with such men as Franklin Sherman, Bruce Anderson, C. L. Sams and others pushing, North Carolina should in time assume her place as a honey producer of the first rank.

Feed and Save the Bees

To the Beekeepers of Massachusetts:

The honey market is experiencing unprecedented demands. More honey should be produced in 1918; hence, save your bees and prepare for maximum production.

Colonies in various localities of the State, by force of circumstances, have insufficient stores to enable them to survive the winter. (To winter a colony in Massachusetts requires at least 30 pounds of stores; calculate in proportion the emergency needs.) By arrangement, candy stores to save the bees become available about January 15, through the co-operation of the Sugar Division of the Massachusetts Food Administration which—

"Realizes the value and importance of beekeeping and has prepared to support by suitable arrangements the measures now being undertaken by the Massachusetts State Board of Agriculture for the relief of the beekeepers throughout the commonwealth."

It is Necessary to Act at Once

First. See what further stores your colonies immediately require. It not being wise to try to feed sugar syrup during winter, try to supply additional stores in the form of candy. This, in the emergency, becomes available about January 15, at distributing centers as below.

Second. Then if your colonies are not protected and packed to keep them warm, do this at once. (Information will be sent upon request.)

Distributing Centers

It having been impossible to arrange sugar distribution for home candy making, the Board of Agriculture has designated the following as distributors of soft candy for bees during the emergency:

Boston—H. H. Jepson, 182 Friend street.

Springfield—A. C. Andrews, Box 1474.

Worcester—Ross Bros.' Company, 90 Front street.

Orders, which will be accepted only from Massachusetts beekeepers, should be sent to your nearest distributor, accompanied by cash, and for the least possible candy necessary. Later in the season further supplies of candy should be available, hence, please do not stock up with more than you must use at present.

The number of colonies to be fed should be stated with your order.

Directions for Feeding

Candy is procurable in paper pie plates or paper dishes. These are to be inverted (candy side down) directly over the bees, on top of the frames, in an empty super. A two-pound package is estimated to serve a colony about three weeks. One or more slabs of candy may thus be placed in a super and replaced as often as necessary. Over the candy, fill the super with insulative packing (any dry, warm material) in order to conserve all the heat possible. Keep everything dry.

If it is a cold day, work rapidly, but feed rather than to starve your bees. Do not delay feeding.

Very truly yours,
BURTON N. GATES,
Inspector of Apiaries and Collaborator U. S. Bureau of Entomology, Bee Culture Investigation.

DR. MILLER'S ANSWERS

Send Questions either to the office of the American Bee Journal or direct to
DR. C. C. MILLER, MARENGO, ILL.
He does NOT answer bee-keeping questions by mail.

Making a Colony Queenless—Demaree Plan

1 In my locality where little honey is coming in after July, and the bees consume a portion of the stores left on for winter, my colonies are in 2, 3 and 4-story hives by the last of July, full of bees, and the hives average from 8 to 16 frames of brood to the colony. As the bees raised from the eggs laid by the queen after the 10th to the 15th of June will be of little value to gather the clover flow and be too old for the best results in wintering, why not take away the queen about the 10th or the 15th of June. If she is a good one save her to increase or requeen and let the colonies raise a new queen, which will help in swarming, do away with the bees that would hatch in time to be consumers, and those raised from the new queen would be in better shape for winter.

Where the flow depends most on the clover would there be any objection to this system?

2. Where can I find the Demaree plan of bee management?

INDIANA.

ANSWERS.—1. I don't know. On the face of it it would look as if your scheme would work out all right; yet it very often happens that a thing that looks good in theory doesn't at all pan out so well when submitted to the bees. The thing to do is to try part of your bees in that way, and see how they compare with the rest. You *may* find that when the queen is gone the bees will not gather so well.

2. The Demaree plan has been given a number of times in this department, and you will find it in "A Thousand Answers," under the head of "Swarm Prevention."

Here is the plan: When a colony becomes strong at the time when swarms may be expected, and especially when it has started queen-cells, put all but one frame of brood in the second story, leaving in the brood-chamber, or lower story, one frame of brood with the queen, and fill up the empty space with drawn-out combs or frames filled with foundation, having a queen-excluder between the two stories. At the time of doing this, destroy all queen-cells, and 7 to 10 days later destroy any that may be started in the second story. That's the Demaree plan, and it may be used even after a swarm has issued and is returned.

Banat Bees—Buckeye Hives

1. Please give me a description of the Banat bee.

2. Do any extensive beekeepers keep them?

3. Would also like a description of the Albino bees.

4. Do many large beekeepers use the Buckeye hives. OKLAHOMA.

ANSWERS.—1. Banats look a good deal like common blacks, but with whitish rings. They have the reputation of being very gentle.

2. I don't know; but I think not in large numbers.

3. Albinos are a shade lighter in color than Italians and like Albinos of the human race, are likely to be inferior in vigor, and so not the best gatherers.

4. They may, but I don't know.

Roasting Out American Foulbrood

To kill the germs of American foulbrood by boiling the frames with lye, the water warps the wood and the lye eats the nails. I roast the frames in the oven up to 400 degrees F., over a pan. The pan gets the wax, the heat gets the germs. The frames get light brown, but not enough to hurt. OREGON

ANSWER.—Water warps wood, to be sure, but I've cleaned hundreds of frames by boiling them in a solution of concentrated lye, and found them all right to use afterward. They were of straight-grained pine. If made of basswood—although frames should never be made of basswood—the wet frames might be weighted down in straight piles to dry.

Lye eats nails, yes, and so does water under proper conditions; but I never found the nails in any frames hurt in the solution of lye. The wax can be saved, too, when you boil.

But your plan of roasting is better if only a few frames are to be treated. If the number is large, I'd rather boil them in a big kettle.

Miller Queen Nursery

Last year I bought about twelve Rauchfuss queen-cages which, according to my opinion would fulfill the purpose of queen nursery.

However, they did not work. It was necessary to put the queen-cells in the cages just one day before emerging. when the bees had loosened the caps of the cells already. Then the virgin could not be kept longer than about a day.

Looking for a substitute I closed a regular frame on one side with a thin board, made about twelve apartments and closed the other side with perforated zinc, so that the bees had access to the cells, but the virgin could not be released. I was very successful this time.

Now, my dear Doctor, if you, in your "queen-nursery," would close one side with perforated zinc instead of using wire-cloth, or if you would cut your eight tins 10x2 of perforated zinc, you will overcome all the disadvantages of your "queen-nursery." In my nursery I put cells in before they are "ripe."

What do you think about my opinion?

WISCONSIN.

ANSWER.—I could tell better what to think of your opinion if that opinion had been more fully expressed. You think perforated zinc instead of wire-cloth would overcome all the disadvanntages of my queen-nursery, but you do not say what those disadvantages are, and I can think of only one. Perforated zinc has been in use for years for queen-nurseries, and more than one disadvantage is connected with its use. Virgins make desperate efforts to get through the perforations, and I've had them die upon being wedged in the openings. Of course, that could not happen with wire-cloth. With perforated zinc the bees may tear down the cells or steal the food and let the baby-queens starve. Of course this will not happen if the nursery is kept in a queenless colony, and is not likely to happen if it is in an upper story over an excluder, but it is often convenient to have a nursery in the same story with a laying queen, and with wire-cloth this is safe. Another point is that if a cell is in any way mutilated the bees will inevitably destroy it if perforations allow them to attack it. Many a time I have cut apart two cells so close together that one of them would have an opening in it, and the queen would mature apparently as good as any, whereas she would have been surely doomed if perforated zinc had been used.

I said I knew of but one disadvantage of the wire-cloth, which is the same as saying one advantage of the perforated zinc. It is that the bees can get into close contact with the cells. I don't know how much advantage that is. One would hardly think that in the middle of the brood-nest a thermometer would show a higher temperature in a little compartment containing bees than in one without them. Yet even if there be no difference in temperatures, it is possible that the very contact of the bodies of the bees closely surrounding a cell may have some subtle influence of real advantage to the occupant of the cell. Admitting that there is such an influence—and I am quite inclined to think there may be—it may be so little that it will be overbalanced by the several disadvantages named. On the other hand, it may be sufficient to overbalance them all. I don't know.

Requeening—Wintering

1. I want to requeen two colonies; when would be the best time to do so?

2. How long after removing the old queen should the new one be introduced?

3. Should I be unable to find the old queen on the first attempt, how long could I keep the new queen in her cage without any bad effects? Should it be necessary to defer the search until the next day, where should I keep the caged queen?

4. What is the most practicable and safe method of introducing the new queen?

5. Having handled three colonies last summer, hiving two of them, but never having seen a queen, would you advise me to use much smoke in the quest?

6. When a queen is shipped are there any bees shipped with her? If so, what should be done with these bees when the queen is introduced?

7. I am wintering out doors, packing the super with burlap and building a box all around the hive with a 4-inch space on all sides, top and bottom, packing this space with maple leaves, putting on a board cover with rubberoid roofing. I put the regular cover over the super and am beginning to think I should have left it off. Should I?

8. How soon in the spring should I remove the burlap in the super and the winter packing around the hive? ILLINOIS.

ANSWERS.—1. That depends somewhat on when the question is asked. All things considered, probably there is no better time than toward the close of the honey harvest. Yet if you want to introduce a pure queen so as to rear queens from her, it will be better not to wait so late, for if you should you would rear no queens from her the same season. So in that case it would be better to replace a very poor one, it will be better not to wait till fall.

2.There is not entire agreement about this. Some introduce the new queen at the time the old queen is removed; some introduce her a day or two after the removal of the queen; and perhaps the larger number put the caged queen into the hive upon removal of the old queen, but have the cage candied so that the queen will not be released by the bees until a day or two later. Some take the still further precaution to give the caged queen upon removal of the old one, but have the candy protected from the bees for a day or two before allowing them to eat it.

3. The new queen can be kept in her cage two or three weeks if there is plenty of food, and she may be kept wherever there is no danger of being chilled, say above 60 degrees, but about the best place to keep her is in the hive into which she is to be introduced, but not allowing the bees to get at the candy to release her.

4. Oh, my! It would take quite a book to tell all the ways that are claimed as best. Perhaps no way is more generally in use than with a provisioned cage in one of the ways mentioned in second answer.

5. There is hardly any way you can make more sure you will not find the queen that to deluge the bees with smoke. Use just as little as possible to keep the bees from flying at

you. If you do not find the queen after looking over the combs once or twice, close the hive and look again an hour or more later.

6. Yes; ten or more workers are in the cage with the queen, and you pay no attention to them, allowing them to stay in the cage and come out when the queen does.

7. Some say leave the cover on, but the most part would say it is better to leave it off.

8. Better not till bees are flying every day, or even until late in May, unless you are afraid the bees are running short of stores.

Requeening

I have thirty colonies of black bees in my home yard, and I want to Italianize them. Do you think I can do so by buying a pure breeder and requeening them in early May, then requeening again in September with the same breeder in the same yard? Would all the black drones be gone by that time?

In my locality I can rear good queens in May and September. ALABAMA.

ANSWER.—Yes, if in May you replace your black queens with daughters of a pure queen, there would most likely be nothing but pure drones left in your apiary in September. But would it be necessary to requeen in September? Would not the chances for pure stock be just as good if you should wait till the next year to requeen? You seem to take it for granted that there will be no trouble from drones in surrounding apiaries, but that's a matter to be reckoned with unless nothing but pure stock is to be found within something like two miles of you.

Moving Bees

I bought 12 colonies of bees and am going to move them about twenty miles. Is it advisable to remove the packing and cover them over with screen cloth? Of course it will be in the spring when I move them.

LONG ISLAND.

ANSWER.—On a very hot day it would be desirable, and perhaps absolutely necessary to replace the cover with a screen, but on an ordinary spring day it would not be necessary.

Damage in Moving—Age of Queen—Feeding

1. I bought a few swarms of bees on frames not wired, but joined together. In moving them I broke the combs and some of the honey is running out. How would you treat the bees, now or in the spring? They are in furnace cellar now.

2. How do you tell the age of a queen?

3. How much and at what time do you begin stimulative feeding in spring?

4 How much should an 8-frame hive weigh when it is taken out in spring?

5. Would it be better to feed the required amount of honey or syrup at one time?

5. How much sugar does it take to equal a pound of honey fed to bees?

6. How much water do you feed to bees to a pound of sugar. IOWA.

ANSWERS.—1. Let them entirely alone while they are in the cellar, and even till fruit-bloom. Then lift out some or all of the frames that are freely movable, and cut apart the combs that are joined together, where possible crowding each comb into place in its own frame. If the combs are too badly broken down for this, then you will treat the case the same as in box-hives.

2. By looking in my book to see when she was born or clipped. There is no way by which you can be sure of the age of a queen by her looks, although as you gain experience you can make a pretty good guess by the more or less shiny look of an old queen, and by her slower movements on the comb.

3. I don't begin stimulative feeding in the spring or any other time. I see that abundance of food is present, and that's all the stimulation the bees need. There are places where there is a dearth of pasturage in the spring for so long a time that stimulative feeding is necessary to make the queen lay; but that doesn't happen here, and I don't believe it does in Iowa.

4. That varies. A hive may weigh 40 pounds and contain plenty of honey, while another of the same weight allows the bees to starve. The first has new combs that are light, with little pollen, while the second has heavy old combs loaded with pollen.

5. Generally it is better.

6. Any time early in the season you can feed sugar and water, half and half, but in feeding late for winter use 2½ parts sugar (either by weight or measure) to one of water.

Now, look here; seeing it's you, I'm willing to give you a little friendly advice: Don't go to fooling with sugar for bee-feed. Use honey and save sugar for the allies. Every time you do that you're hitting the Kaiser a whack on the "snoot," and goodness knows he needs all

Crop Report and Market Conditions

Honey

Stocks of honey are dwindling to such an extent as to be considered almost negligible. One large bottling firm is now paying 17 cents for good white honey where it can find it, and with but few offerings.

Still a few beekeepers are holding small quantities, "just to see what the market will do." One advises that he has about fifty cases of fancy extracted for which he is willing "at present" to take 20 cents per pound.

A letter from a British subscriber states that the British Beekeepers' Association has recommended a price of 60 cents per section for comb honey at retail and 40 cents per pound for extracted at retail. This, of course, is caused by the extreme demand for honey there owing to shortage of sugar.

Unless our food committees regulate the prices to be received for honey, or unless the war ends in the meantime, we cannot see where the price of honey in this country can drop very low, during 1918.

WINTER LOSSES

Reports from Texas are not very encouraging. Following two seasons of drought and short crop, many colonies have died, probably a larger proportion than in any recent years, and the outlook is anything but rosy. Many beekeepers are abandoning beekeeping altogether and melting up combs rather than pay the prices asked for sugar, which is also hard to obtain.

Only a few reports are coming in from the central sections and from the north. These differ widely. Where bees went into the winter in good shape with plenty of stores and ample protection, the losses seem to be about average.

There is some loss from starvation already and several reports of losses from poor food, combined with long confinement.

MARCH REPORT IN FULL

For our April number we expect to make a detailed report of conditions as reported to us by reporters over the country.

the whacks you can give him. Then, when the war is over continue the same plan, because honey is better for bees than sugar. "Haven't any honey." Well, that's bad, and you'll have to use sugar. But don't let it happen again. Each year save up enough combs of sealed honey so that you will have an abundance to give to any colony that needs it, and unless your hives are large you will find that most of your colonies will be better for one or more extra combs each spring.

Receiving Shipped Queens

1. I want to send South for some queens for requeening next spring, which I want to do as early as possible. Now, suppose I order queens to be delivered about April 20 and we should happen to get some bad weather for some days so I cannot open the hives, what can I do to save the queens?

2. How long can a queen be kept alive away from other bees?

3. Does it make any difference how far I send South for my queens, or is it better to get them as far North as possible? If so, how far North will they have queens ready for shipment April 15? MICHIGAN.

ANSWERS.—1. Keep them in the house where it will not be colder than 60 degrees, making sure that the food is not exhausted. But I wouldn't think you would want them before at least a month later.

2. I don't know how long without any bees at all; but with the usual escort she would likely be all right for two or three weeks.

3. I don't think it makes any difference how far South you send. You would hardly get queens April 15 without sending south of 35 degrees.

Feeding Honey

We are having severe weather here and my bees will need a little feed in April. Can I feed honey that has soured, next spring, after the bees have a flight?

ANSWER.—After bees are flying daily there is no harm in feeding such honey. But it should not be fed in the fall.

Sugar Candy

1. Would bees live on a cake of sugar if it was placed over the brood frames in the winter or spring?

2. Will bees live on common dry granulated sugar? ILLINOIS.

ANSWERS.—1. They will live on a cake of sugar candy, but I doubt if wetting granulated sugar and letting it dry will make a good cake of candy. You must boil it first.

2. I think not.

Carniolans

I want to keep bees this spring, but I cannot decide what kind to get. I would rather keep Carniolans, because I understand they are the best honey gatherers. Because of their large size, I think the ordinary wax foundations and bee supplies are too small for them. Please tell me if this is so. I want to run for extracted honey alone, and use the Dadants' big hive Do you think they would do well? WISCONSIN.

ANSWER.—You have been wrongly informed as to the size of Carniolan bees. Ordinary supplies, including foundation, are used with them, and I don't think you could get foundation of larger size if you wanted it. If you had them side by side with Italians I don't think you would see any difference in size. Most beekeepers prefer Italians. Comb foundation of the usual size is used in the big Dadant hives.

Classified Department

Advertisements in this department will be inserted at 15 cents per line, with no discounts of any kind. Notices here cannot be less than two lines. If wanted in this department, you must say so when ordering.

BEES AND QUEENS

FOR SALE—First-class Italian queens and bees in season. Send for price list. Free from disease; safe arrival and satisfaction guaranteed. M. Bates, Greenville, Ala., R. 4.

BREEDING QUEENS—I have a few extra choice Italian breeders for spring delivery. Price $5 each.
J. E. Wing, 155 Schiele Ave., San Jose, Calif.

OUR BRIGHT ITALIAN QUEENS will be ready to ship after April 15. Untested, 75c each, $8 per doz., or $65 per 100. Safe arrival guaranteed.
Tillery Bros., Georgiana, Ala., Route 5.

FOR SALE—Fine Italian queens at 90c each, $9 per doz. Ready April 15. Safe arrival guaranteed.
T. J. Talley, Route 3, Greenville, Ala.

THREE-BAND ITALIANS ONLY—Queens, packages and nuclei. Untested queens, each $1, 6 $4.25, 12 $8.25. Write for prices in larger lots, also nucleus and packages; booking orders now. If you consider quality, pure mating and low prices I am your queen-breeder. I have adopted Gleanings Code for the sale of bees and queens. H. G. Dunn,
The Willow, San Jose, Calif.

GOLDENS THAT ARE TRUE TO NAME—Queens, nuclei and bees by the pound; we receive hundreds of testimonials annually. Write for list. Untested queens, each $1, 6 $4.25, 12 $8.25. Write for prices in lots. We are now booking orders for early delivery. We have adopted Gleanings code for the sale of bees and queens.
Garden City Apiaries, San Jose, Calif.

FOR SALE—Bees. April 15 is the date on which we can ship you the best three-banded bees and queens on the market; we have been in the bee business continually for twenty-four years and have been striving to secure the best three-banded bees which money could buy and skill produce, all these years. Judging from the many letters we have received from satisfied customers, we have succeeded in our efforts. We believe we can furnish you with the best honey-gatherers to be found anywhere. You will find our nuclei better filled with bees and brood than any other nuclei you can buy. All our bees are on standard, wired, Hoffman frames; full sheets of foundation. File your orders now, sending money when you want the bees shipped. Satisfaction and safe arrival guaranteed. We quote you, without queen, as follows: Three-frame nuclei, $2.75; two-frame nuclei, $2.25; one-frame nuclei, $1.75; three pounds bees, $3.75; two pounds bees, $2.75; one pound bees, $2.00. If queen is wanted with bees, add price of queen wanted. Young untested queens, 75c; young tested queens, $1.
The Hyde Bee Company,
Floresville, Texas.

BEES AND QUEENS from my New Jersey apiary. J. H. M. Cook,
1Atf 84 Cortland St., New York City.

TESTED leather-colored queens, $2.00; after June 1, $1.50; untested, $1.00; $10 per doz. A. W. Yates, 3 Chapman St., Hartford, Conn.

GOLDEN Italian Queens, bred strictly to produce Golden bees of the best honey-gathering strain; untested, each, $1; 6, $4.25; 12, $8.25; 100, $60. Satisfaction guaranteed.
L. J Pfeiffer, Route A, Los Gatos, Calif.

GOLDEN Italian Queens, untested queens, $1 each; six, $4.25; $8.25 per doz., 50, $32.50; $60 per 100. Tested queen, $1.50; one frame nucleus, no queen, $1.25; 2-frame, $2.25; 3-frame, $3; breeders, $5 and $10.
L. J. Dunn, 54 Broadway Ave., San Jose, Cal.

WANTED—10 to 100 swarms of bees not over 50 miles from Bellevue, Ohio.
N. B. Querin, Route No. 7.

FOR SALE—I still have for sale some of the high grade Italian bees, I advertised in the February issue of the American Bee Journal, a year ago. They are in good eight-frame hives. Price, with one super, $5. Still too many bees in town. Only one block from main street, reason for selling. G. F. Schilling,
State Center, Iowa.

FOR SALE—Warranted queens from one of Dr. Miller's breeders; also limited number of package bees. Write for prices.
Geo. A. Hummer & Sons,
Prairie Point, Miss.

FOR SALE—Mott's strain Italian queens. Plans, "How to Introduce Queens and Increase," 25c. E. E. Mott, Glenwood, Mich.

THREE-BANDED Italian Queens, untested, one, $1; doz., $9; nuclei and packages with fine queens, 2-fr., $3.75; 3-fr., $4.50; 1 lb., $2.50; 2 lbs., $3.50; 3 lbs., $4.50; June 1.
A. E. Crandall & Son, Berlin, Conn.

THE best Italian stock, three-bands and goldens at $2.50 per pound, without queen; 2 pounds, with queen, $4. Rosedale Apiary.
J. B. Marshall & Son, Big Bend, La.

BOTH Italians and hybrid bees at $2.50 per pound with untested queen; 2 pounds, with queen, at $4.
Mrs. T. H. Carruth, Big Bend, La.

FOR SALE—Golden Italian bees; 1-lb. pkg., with queen, $2.50; 2-lb. pkg., with queen, $4; 2-frame nuclei, with queen, $3.50.
L. J. Bond, Big Bend, La.

HAVE YOU, Mr. Producer, been getting all for your honey that you could expect? If the price you have been getting has been less than the largest price you have read about, let the Domestic Beekeeper, Northstar, Mich., help you dispose of your 1918 crop. Investigate.

GOLDEN QUEENS that produce Golden workers of the brightest kind. I will challenge the world on my Goldens and their honey-getting qualities. Price, $1 each; tested, $2; breeders, $5 and $10.
2Atf J. B. Brockwell, Barnetts, Va.

THREE-Banded and Golden Italian Queens and pound packages in spring, from the Sunny Southland. Grant Anderson,
Rio Hondo, Texas.

PURE 3-banded Italian queens, untested but warranted, $1; 6, $5; tested, $1.50; 6, $8. Last year's tested queens, clipped, $1. Good fat nuclei and full colonies in abundance. Write for price list. J. F. Diemer,
Liberty, Mo.

BEES WANTED—From one to 100 colonies within 200 miles; also used equipment.
John E Geiger, Syracuse, Kans.

BEES AND QUEENS—What a pleasure when you know and I know and the bees know that you have placed your order to be shipped to you in April and May; no war prices. Write
S. Mason, Hatch, N. M.

THREE-BANDED Italians; untested queens in April and May, one, $1; 6, $5; 12, $9. Tested, $1.50 each. One-pound packages of bees, $1.50 each; two-pound packages, $2.50 each. Add price of queens if wanted. If you want as many as 50 packages write for prices and discounts on early orders. Safe arrival and satisfaction guaranteed. No disease, and all queens purely mated.
Cotton Belt Apiaries, Box 83, Roxton, Texas.

GOLDEN and 3-banded Italian queens will be our specialty. We can also furnish Carniolians. Tested $1, untested 75c each. Bees, per pound, $1.50; nuclei, per frame, $1.50. Send your order for bees early.
C. B. Bankston &, Co., Buffalo. Leon So., Tex.

HONEY AND BEESWAX

FOR SALE—Two barrels amber honey, boneset, smartweed and goldenrod; 104 gallons in lot, and best offer takes it.
J. F. Archdekin, Bordelonville, La.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendered.
The Fred W. Muth Co.,
304 Walnut St., Cincinnati, Ohio.

WANTED—White or light amber extracted honey in any quantity. Kindly send sample, tell how your honey is packed and your lowest cash price; also buy beeswax.
E. B. Rosa, Monroe, Wis.

FOR SALE—Alfalfa white extracted honey in new 60-lb. cans; if interested quote me a price. Sample, 10c.
J. M. Minkes, Box 112, Basin, Wyo.

EXTRA Fancy Montana Extracted Honey in new 60-lb. cans, $12 per can; 6 pails weighing each 10 lbs., net per case, $12.60; 6 pails weighing each 10 lbs. gross, per case, $12. Last and best of the crop.
B. F. Smith, Jr., Fromberg, Mont.

WANTED—Comb, extracted honey, and beeswax. R. A. Burnett & Co.,
6A12t 173 S. Water St., Chicago, Ill.

WANTER—Beeswax at all times in any quantity, for cash or in exchange for supplies.
Dadant & Sons, Hamilton, Ill.

SUPPLIES

ARE YOU keeping well posted on the crop condition and price prospects for your 1918 crop of honey? If not, you should! The Domestic Beekeeper, Northstar, Mich., will keep you posted on crop condition and price prospects as recommended by the Committee of the Chicago Northwestern Association. This committee, through the Domestic Beekeeper, saved producers a half million dollars on their 1917 crop of honey and expects to do even better on their 1918 crop. Are you one who is not taking advantage of an opportunity never before offered to secure all your crop of honey is worth? This opportunity is worth investigating.

CONSERVATION PASTE—Costs less than 1c per pint; will stick your label on anything any time; easily and quickly made; no boiling; simple ingredients; ready for use in 30 seconds. Send 25c for formula. Money refunded if not satisfactory.
Sunnyside Apiaries, Fromberg, Mont.

NORTHWESTERN BEEKEEPERS — Save time and freight charges by ordering supplies near home. Best standard goods, factory prices. Send list of wants, and I will quote lowest prices. Catalog upon request.
George E. Webster, Valley View Farm Apiary,
Sioux Falls, S. Dak.

FOR SALE—One thousand beehives with supers; three-fourth dovetailed, balance halved together at corners and nailed both ways. Hoffman frames throughout. We will guarantee them to be sound and free from disease. Will sell all or any part at about half what new hives will cost. Apply to The Hyde Bee Co.,
Floresville, Texas.

200 VEGETABLE PLANTS, $1, including tomatoes, peppers, egg plants, lettuce, celery, cabbage; 100 flowering plants $1; choice assortment R. I. Red eggs; day-old chicks, bees, queens, honey. Grubb,
Box B 14, Woodmont, Montg. Co., Pa.

"BEST QUALITY" comb foundation for L. or H. frames; 20-pound lot; med. brood, 55c; light brood, 60c. Pure natural beeswax, not "Weed process."
J. J. Angus, Grand Haven, Mich.

$1,200 for the best comb-honey outfit in central Iowa. Box 42, Colo, Iowa.

FOR SALE—A lot of comb-honey supers, 25 and 35 cents each; mostly with sections and foundation; no disease. Also a large showcase 40 in. long, 36 in. high and 24 in. wide; glass on all four sides; price, $5. A light scale and other supplies.
Chester E. Keister, Clarno, Wis.

FOR SALE—Cedar or pine dovetailed hives, also full line of supplies, including Dadant's foundation. Write for catalog.
E. Burdick, Sunnyside, Wash.

HONEY LABELS

HONEY LABELS—We have just issued a new and up-to-date catalog of honey labels and stationery. Write for your copy. Neat labels and quick delivery guaranteed.
American Bee Journal, Hamilton, Ill.

SOUVENIR Bee Postal Cards, 5 for 10c; "Songs of Beedom" (10 songs), 20c, all postpaid. George York, Sandpoint, Idaho.

WANTED

WANTED—50 to 200 colonies of bees, preferably near home.
H. G. Quirin, Bellevue, Ohio.

WANTED—White sweet clover seed; send sample; state quantity and your lowest price in first letter.
Dadant & Sons, Hamilton, Ill.

WANTED—300 or less colonies of bees for cash and spring delivery. Correspondence, with full particulars, solicited.
A. W. Smith, Birmingham, Mich.

WANTED—Bees; 1 to 100 colonies.
C. O. Smith 5446 Cornell Ave., Chicago.

WANTED—Bees to work on shares or rent; have good location and experience. Write for particulars. J. H. Waibel,
Kawkawlin, Mich.

WANTED—To buy, a two or four-frame extractar. State condition and price.
Addison Gould, Buckhannon, W. Va.

WANTED—Your old combs, cappings or slumgum to render into beeswax by our high steam pressure wax presses.
Dadant & Sons, Hamilton, Ill.

WANTED—We are looking for old bee-books, back numbers of the Bee Journals, issued prior to 1907, etc., for some of our subscribers who wish to complete libraries of beekeeping literature. Just now we want especially copies of Alley's Beekeepers' Handy Book, the second volume of Cheshire on Beekeeping, and copies of Harbison's and Wildman's books. Readers having old beebooks or bee journals which they no longer care for will please write us fully what they have to offer, with prices asked.
American Bee Journal, Hamilton, Ill.

SITUATIONS

WANTED—Position as student helper in large bee business. Have had some experience. Can give best of reference as to my character and reputation. Henry Eggers,
Eau Claire, Wis., R. F. D. No. 1.

HELP WANTED—Will give experience and fair wage to active young man who is not afraid of work, for help in large, well-equipped apiaries for season starting in April. State present occupation; also age, weight and why exempted. Morley Pettit,
The Pettit Apiaries, Georgetown, Ont. Can.

YOUNG LADY, refined, educated, good worker, desires season on commercial apiary in Southern States; some knowledge of poultry and green-house work.
R. A. F., care Fifth Ave. Bank,
New York City.

WANTED—Man to work with bees, season 1918; state age, experience and wages on basis of board furnished by us. Address
The Rocky Mountain Bee Co., Billings, Mont.

WANTED—By middle-aged man, with experience, 100 to 150 colonies of healthy bees, equipped for extracted honey, to work on shares. M. Knudsen, Albert Lea, Minn.

WOULD YOU like to receive four or five hundred dollars per hundred more for your 1918 crop of honey than the big buyers will offer you? The Domestic Beekeeper, which will cost you but $1 per year, will show you how. This is no guesswork; we have done this very thing with hundreds of our subscribers on their 1917 crop, and are willing to do the same by others. You will make your greatest 1918 mistake if you do not, every one of you investigate the work of the Domestic Beekeeper is doing for its subscribers, along the line of buying and selling for them.

WANTED—One or more men of some experience in the handling of bees. Prefer them to be under or past military age and morally of good habits. A good chance for the right party or parties to earn fair wages and learn queen-breeding, the package business and honey production.
M. C. Berry & Co., Hayneville, Ala.

WANTED—Young man for season of 1918, as helper, and learn bee business; experience not required. Board and good wages to right man. A. J. McCarty,
712 Coffman St., Longmont, Colo.

WANTED—Can take two students for season of 1918; board given in exchange for work, and more if season is good; running ten apiaries. R. F. Holtermann, Brantford, Ontario, Can.

WANTED—Industrious young man, fast worker, as a student helper in our large bee business for 1918 season. Truck used for outyards and hauling. Apiaries located near summer resorts. Will give results of long experience and board and small wages. Give age, weight, experience and wages in first letter.
W. A. Latshaw Co., Clarion, Mich.

WANTED—Expert comb-honey man, with references, to handle 700 stands of bees. Good proposition to right man.
Hagerman Valley Bee and Honey Co.,
Hagerman, Idaho.

FOR SALE

FOR SALE—Wishing to retire from active business, I offer for sale 300 colonies bees in 8 and 10-frame L. hives; 750 full depth extracting supers, with combs; 400 section honey supers; 300 honey boards; 75 escape boards; eight-frame power extractor, with honey pump; four H. P. gasoline engine; saw with dado, planer heads and attachments for making supplies; a complete apiary in No. 1 condition; good location. 1917 crop was 14 tons honey. Will also sell my home place of ten acres, 5-room house and No. 1 improvements, near to a $5,000 schoolhouse. Will sell home separately and give terms. J. R. Marlow,
R. D. No. 1, Weiser, Idaho.

FOR SALE—Small fruit farm and bees, cheap. W. H. Gray, Chillicothe, Ill.

PATENTED Jan. 1, 1918, the C. B. Saunders Bee Feeder, a bee feeder which is made to go down into the brood-chamber. If any manufacturing company or companies are interested in the patent write,
Chas. Boone Saunders, Barrington, Ill.

LAST FALL Mr. Smith asked us our advice on when best to sell his crop of 15,000 lbs. of clover extracted honey. We answered him by advising that he hold until May, unless he got a good round price for it before. He could at that time have taken something like 12c per pound for it. He held it. At our Michigan State Convention last December, he again asked what we thought about the future price of honey. He could then get 17c per pound for it. We advised him to hold. He sold the entire crop the other day on board the cars for 18½c per pound. Mr. Smith's case is only one in hundreds of cases where producers have done well by following the advice of the Domestic Beekeeper. We want every beekeeper who has honey to sell to send in his dollar for the Domestic Beekeeper during 1918. We have the back numbers. o can begin your subscription with the January number, thus making your volume complete. Do it today, and at the end of the year get your dollar back if you think you have not received its worth.

I Am Ready to Book Orders Now

for spring deliver for Italian bees in pound packages at $1.40 per pound. Tested queens, $1.25. Untested, 90c, 6 for $5.00. Safe arrival guaranteed. Free from disease.
C. H. COBB, Belleville, Ark.